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NAVAL POSTGRADUATE SCHOOL

Monterey, California



THESIS

URBAN OPERATIONS: THEORY AND CASES

by

Gregory K. Anderson
Ian C. Rice

June 2003

Thesis Co-Advisors:

John Arquilla
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URBAN OPERATIONS: THEORY AND CASES

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ABSTRACT

This thesis examines military performance in both urban and traditional non-urban environments. Cases used in this study are German operations on the Russian front, Israeli operations during the Yom Kippur War, and U.S. Marine operations in South Vietnam. This thesis establishes a framework for analysis consisting of six factors. These include environment, time, informational aspects of military operations, application of existing technology, intangible human factors, and the decision-making of both political and military leaders. Analysis of the three cases points to a number of common trends including, shortcomings when units enter in the urban environment. We note a lack of urban operations training, an increase in time to accomplish tasks, a resistance to operate at night, difficulty processing and communicating information, and micro-management of city fighting by political and military leaders who typically refrain from such management during non-urban combat. Results of this study suggest a need to incorporate consideration of our six factors into current doctrine.

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I. A DIFFERENT WAY TO THINK ABOUT URBAN WARFARE

Cities present a most complex and dynamic environment for combat. The growing urbanization of the world's population, rapidly evolving global interdependence of cities, and the asymmetric advantages urban terrain offers technologically inferior forces suggest that the probability and significance of urban warfare will greatly increase in the future. During the Cold War, U.S. military doctrine called for operations to avoid cities if possible (FM 90-10, 1979). This school of thought likely developed from the excessive costs and violence associated with urban combat that were discovered (or rediscovered) during operations in WW II to include: Aachen, Manila, and Berlin, to name a few. Only recently has urban combat been addressed as unavoidable.

A. THE PURPOSE AND SCOPE OF THE STUDY

The purpose of this study is to improve understanding of the forces at play in a city during combat operations and to determine whether there is a way to control and manipulate these forces with the goal of making urban operations more effective. Combat in the urban environment affects units differently than fighting in other types of environment. Urban combat is not necessarily more difficult; rather, it is more complex. Failure to understand how the characteristics and dynamics of the urban setting impact operations is manifested in increased costs in lives, resources, and total damage, which leads to the perception that urban warfare is harder and to be avoided if possible.

Recent conflicts in Somalia, the former Yugoslavia, Chechnya, the West Bank, and Iraq have witnessed a marked rise in the number of battles fought in urban terrain. Militaries which choose not to address the nature of urban battle beforehand typically find themselves forced to change strategies and tactics during the execution of urban operations, thus generating confusion, uncertainty, and ineffectiveness. Units structured, equipped, and trained for linear combat at extended ranges, involving intricate technical systems, disciplined formations, and centralized decision-making quickly discover that the urban environment nullifies two-dimensional doctrines and causes the battle to devolve into a series of small scale primordial melees. Commanders lose control of their units, and individual soldier tenacity, ability, and resolve become more important to the result than in other environments. As General Vladimir Chuikov, commander of the

Soviet 62nd Army at Stalingrad, put it, “Fighting in a city is much more involved than fighting in the field. Here the ‘big chiefs’ have practically no influence on the officers and squad leaders commanding the units and subunits” (as cited in JP 03-06, 2002).

For much of history, generals hoped to avoid urban combat due to the terrible costs to their armies, civilian populations, and the cities themselves. Sieges most likely emerged as the dominant tactic for capturing cities because storming them was too costly. But, no matter how much commanders wished to avoid the costs of urban combat, these operations persisted, from the sack of Carthage in 146 B.C. to the fall of Baghdad in 2003. Armies trained and organized to think and fight on open terrain have struggled to address the nature of urban warfare. From the Roman legions in Jerusalem in 70 A.D. to Russian motorized rifle regiments in Grozny in 1994-1996, armies unfamiliar with how the urban environment challenges their organization have seen their effectiveness, advantages, and capabilities greatly reduced. One of the doctrinal legacies of WWII, lasting through the end of the Cold War, was that urban combat was to be considered a peculiar problem, best handled with greater numbers and superior firepower (McClarín et al., 1987). Wishing to avoid the costs associated with positional warfare in cities, militaries called for avoiding cities whenever possible even though many of these militaries possessed an urban doctrine.¹

The post-Cold War environment and experiences in Somalia, Northern Ireland, and Chechnya led to a renewed interest in urban warfare and a rebuttal of the idea that fighting in cities could be avoided. This renewed interest generated a series of doctrinal revisions, technological studies, and policies regarding urban warfare. The fruits of these efforts have been reaped by militaries that subsequently adapted their combat systems, training, and tactics to account for the urban environment. The recent effectiveness of the Russians in the Third Battle of Grozny 1999-2000, the Israelis in the West Bank, and the U.S./U.K. operations in Iraq, suggest that some units have been properly prepared to handle the challenges of urban operations.

¹ U.S. Army field manual, FM 90-10 dated 1979 advises commanders to avoid urban battle. Olga Oliker, in, *Russia's Chechen Wars 1994-2000* (2001), determined that Russian urban doctrine prior to the first battle of Grozny advocated the bypassing of cities unless otherwise absolutely necessary. Brigadier General (retired) Avidor of the Israeli Defense Force, during a guest lecture at the Foreign Military Studies Office, Fort Leavenworth, KS on 12 March 2003 said following the 1973 Yom Kippur War, many Israeli officers did not want an urban doctrine, because then there would be an excuse to conduct urban operations.

But do these cases represent the worst that cities can throw at soldiers? We think not, and because of this there is a continuing need to improve urban combat capabilities for long-term stability and influence. In our review of military theory, history, and current literature on urban warfare we have yet to find a comparison between urban and non-urban environments that convincingly demonstrates how challenges are magnified as units transition from one environment to the other. Consequently, this study seeks to answer the question, “How do cities affect **time, information, use of technology, human factors, and decision-making** differently than do other environments?” In order to address this question, this study will briefly review classic military theory, contemporary literature on urban warfare, and current U.S. urban warfare doctrine to determine the origin and present state of thought about the subject, and the extent to effectiveness with which these factors are already addressed. Following this review, our hypotheses about urban combat are presented and we then examine the cases of Stalingrad, Suez City, and Hue. These cases will show the extent to which each factor is or is not magnified as the same or like units move from a non-urban to urban environment. Following presentation of the cases, the factors will be compared and any identifiable trends will be explained. In the conclusion, we will make recommendations for the conduct of urban warfare by taking these factors into account.

B. THE FOUNDATION FOR CURRENT URBAN DOCTRINE AND THOUGHT

Many of the classic military theorists tend to limit their thinking about treatment of urban warfare to the decision of whether or not to attack a city. While some mention is made of tactics, the predominant theme in classic theory is rooted in the *strategy* of attacking cities or fortifications. The problems encountered during urban operations in Mogadishu and Grozny revived interest in the subject, and the current literature on urban warfare concentrates on the nature of the environment, technical innovations, and recommendations for doctrinal adjustments. Current U.S. military urban doctrine, for instance, reveals improvements in addressing the challenges of urban operations. But, in our view, this updated doctrine guides commanders based on lessons learned from previous urban operations. Current doctrine falls short in educating officers about why and how the urban environment creates a sharp contrast with the non-urban environment, and how those who must make this transition might mitigate the effects.

1. Classical Military Theory

The problems and challenges associated with waging urban warfare have been around since ancient times. Sun Tzu wrote about urban warfare as early as 500 B.C., during a very violent period in Chinese history when sieges were common and technologies for urban attacks were advanced. In *The Art of War*, (Griffith, 1963) Sun Tzu advised against attacking cities because they degraded freedom of maneuver, required inordinate amounts of time and soldiers, and caused loss of initiative. Sun Tzu implied that besieging or storming a city led to positional attrition-type warfare, which to Sun Tzu meant an absence of strategy. Sun Tzu did recognize that there were proper occasions for attacking a city, but only when that effort would lead directly to the enemy's defeat. His most explicit advice on urban warfare is found in his famous quote, "The worst policy is to attack cities. Attack cities only when there is no alternative" (Griffith, 1963, p. 78). It is clear in reading Sun Tzu that he understood the costs associated with urban warfare, but he stopped short in his explanation about the relationships between urban warfare and costs.

In Josephus Flavius' account of Titus' costly seizure of Jerusalem in 70 A.D., Josephus observed that the narrow winding streets of Jerusalem were not conducive to moving in massed formations, thereby forcing the Romans to move in small groups that had to guard their flanks continuously as well as fight to their front. Clearly the Romans were masters of siege warfare, but once they made it past the walls, Josephus indicates that they were not fully prepared or comfortable with fighting in the city streets (Farmer, 1960, pp. 203-207).

Niccolò Machiavelli witnessed many sieges in northern Italy during the 16th century and saw first hand the terrible costs associated with that form of maneuver. He advocated in his book, *The Art of War* (Farneworth, 1965), that the best way to attack a city is to "fall upon it unaware" (Farneworth, 1965, p. 195). He believed that the best way to engage in urban combat was to attack with speed, surprise, and shock in order to gain and keep the initiative. He advocated that it was better to draw an enemy out of a city than to commence siege warfare; this was exemplified, for instance, by Scipio who drew Hannibal out of Carthage by moving his army away (Farneworth, 1965, p. 195).

Machiavelli was also one of the first theorists to acknowledge the usefulness of the civilian population in defending a city. He mentions that people unaccustomed to siege can easily be persuaded to surrender, especially if an army can generate fear or panic within the population, but that it is necessary to grant the population quarter or allow people an avenue of escape to prevent them from feeling the need to stiffly resist (Farneworth, 1965, pp. 190-195). Additionally, Machiavelli makes a few tactical observations, but, in general terms, like Sun Tzu, he advocates avoiding cities whenever possible.

The Napoleonic Era was the great age of maneuver, when commanders sought decisive victory in open terrain. Much of the thought concerning urban warfare during this period was limited to the challenges of getting through the fortifications and walls. Street fighting, after the breach of outer defenses, was feared, and this trepidation is best captured by Napoleonic author Rory Muir's description about fighting inside a city "...produces nothing but shapeless slaughter without purpose, and an army beyond the control of its general" (Muir, 1998, p. 20). Clausewitz, in *On War* (1976), devotes most of his efforts on urban warfare to the tactical problem of overcoming fortifications surrounding cities. He concluded that infantry comprise the necessary arm for urban fighting, and that military virtue within soldiers is more important in terrain that tends to complicate operations and disperse forces (Paret, 1976, p. 188). At the strategic and operational levels, Clausewitz, implies that urban warfare is to be avoided unless the objective is directly linked to the defeat of the enemy. This relationship is important because Clausewitz understood that the costs in terms of time and violence that are associated with urban combat have the potential to throw political will and military necessity out of sync, which can lead to a host of unintended consequences.

B. H. Liddell Hart, in *Strategy* (Liddell Hart, 1968), and Mao, in *On Guerrilla Warfare* (Griffith, 1978), mention little about the tactics of urban operations, but they do, devote a lot of effort to the examination of will and morale, human psychology, surprise, and the use of maneuver to achieve true concentration. Liddell Hart emphasizes understanding and manipulation of human affairs as opposed to the physical manipulation of combat power. Mao believed that the best way to conduct war was through the use of small units acting independently, constantly moving and constantly

applying pressure (Griffith, 1978, p. 78). Mao believed that a mix of regular and irregular forces is vital to success and that in some environments it may even be beneficial for orthodox armies to function as guerrillas. He also believed in two criteria essential for success in war: “realization of the people’s aspirations” and adaptable leadership not bound by formulae and rules (Griffith, 1978, pp. 76-97).

2. Contemporary Literature and Current U.S. Urban Doctrine

S.L.A. Marshall was one of the first post-WWII military thinkers to call for preparation for urban warfare. In his *Notes on Urban Warfare* (1973), Marshall challenges the doctrinal wisdom of avoiding cities and examines how fighting in cities can best be done. Marshall demonstrates that little theoretical effort has been devoted to the subject of urban warfare, so he offers historical evidence and the principles of war as a way to solve the problem (Marshall, 1973, pp. 3-7). Marshall uses historical evidence from WWI and WWII to develop technical and tactical means for addressing the environmental complexities of the urban landscape. Marshall’s primary area of emphasis is on how to use technologies to overcome urban obstacles (Marshall, 1973).

In 1987, a Defense Technical Institute report, analyzing 22 urban battles fought between 1942 and 1982, concluded that, “current doctrine is well-founded in advising attacking American forces to avoid cities where this is feasible” (McLaurin, Jureidini, McDonald, & Sellers, 1987, p. 3). The report also notes that taking cities consumes large amounts of time; the attacker has an advantage only if the ratio of forces is 4:1 or greater; intelligence and firepower are key factors; and it is easier for an attacker to win if the defender is alienated from the population. The report also addresses the utility of putting technical systems designed to perform other tasks to innovative uses, such as air defense artillery in a ground support role or tanks working behind infantry (McLaurin, 1987).

Dr. Russell Glenn, of RAND, thoroughly analyzes the peculiarities of the urban environment and the impact they have on operations. His work includes examination of environmental differences and the effects they have on time, command and control, and information systems (Glenn, 2000). Glenn also calls for development of weapons, communications, and support systems to account for the environmental challenges presented by urban areas and the need for joint urban operations doctrine. Glenn developed the notion that cities today are bigger and more complex than in WWII, and

that the key to urban warfare lies in overcoming the challenges presented by environmental densities which impact military forces (Glenn, 2000). Glenn proposes that one way to deal with urban combat is to prepare for it, and that the extent of preparations should be an important measure of combat readiness.

In contrast, Lieutenant Colonel (retired) Ralph Peters focuses on the human dimension of the urban environment and the challenges associated with urban combat as a consequence of different cultures, social patterns, and customs. In Peters' mind, the key variable of urban warfare is the population (Peters, 2000); he feels human complexity is greater and more important than the physical challenges of city fighting. Peters also argues that fighting in Third World urban areas will present particular problems for military forces, such as disease (Peters, 1999). He adds that the U.S. military is not fully prepared to handle the challenges of urban combat even though militaries will naturally be drawn into them (Peters, 1999, pp. 71-72). Peters calls for significant restructuring of military units tasked with urban operations to account for the predictable drain on the human capacity to endure continuous high stress, violence, and dramatic change (Peters, 1999, p. 73).

Dr. Roger Spiller, in *Sharp Corners* (2001), calls for a revival of interest in urban operations. He challenges the military to demonstrate a willingness to innovate and adapt policies and doctrine to acknowledge future threats that will use urban terrain as an asymmetric advantage when confronting U.S. military superiority. Spiller's analysis of the urban environment not only addresses its physical and human characteristics, but also succinctly demonstrates how the two are intertwined. His analysis has led him to conclude that cities are linked to supporting systems and have rhythms of activity which, in operational terms, can be somewhat vulnerable to manipulation by military forces. Spiller also examines the long history of sieges and urban battles, and draws lessons from those battles as well as his environmental analysis to propose ideas for updating current approaches to solving the complexities of urban warfare (Spiller, 2001).

Operational experiences throughout the world in the 1990s, as well as the influence of contemporary literature, led to vast efforts to embrace urban training, such as

exercises, experiments, and an overhaul of U.S. urban doctrine. The cornerstone documents of this doctrinal repair are JP 03-06: *Doctrine for Joint Urban Operations* (2002) and U.S. Army FM 3-06: *Urban Operations* (2002).

JP-03-06, written by the U.S. Marine Corps, addresses the need for a joint urban operations doctrine. The premise of this innovative publication is that the urban environment is more difficult and presents a series of unique challenges in terms of personnel and equipment. The crux of JP 03-06 is based on defining the urban environment, and then proposing ways to operate within the constraints presented by that environment. JP 03-06 acknowledges that cities constrain the ability to command, control, and coordinate forces as well as pose challenges to information operations. The main premise for this assertion is that cities can reduce the advantages of a technologically superior army. JP 03-06 does stress the importance of the human dimension of combat, as well as offers several other considerations for executing effective urban operations, such as synchronization and tempo challenges, environmental considerations, and force protection measures. Finally, the publication also addresses the utility for application of several assets rarely discussed in urban warfare, to include: space and psychological operations, civil-military relations, special operations, and consequence management schemes for man made or natural disasters (JP 03-06, 2002).

FM 3-06 is the army's latest revision of tactical-level urban operations doctrine. This publication is designed to provide brigade, battalion, and company level commanders and staffs insight into how to conduct urban operations. The manual does provide very detailed guidance on analysis of the physical characteristics of the urban environment, and it details a host of tactics, techniques, and procedures for executing urban operations—from crossing a street to clearing a building to calling in fire support (FM 3-06, 2003).

Our review of the military theory, contemporary literature, and past and present U.S. urban doctrine included many more articles, reports, and manuals, but much of this other literature simply repeated or amplified points made above, or to include simply warning forces to steer clear of urban warfare. Lessons learned from past urban battles, as well as established military principles based on theory, have for the most part provided

the foundation of current thinking about urban operations. From our synthesis of this literature and our own insights into military operations (see bibliography) we derived 5 key factors for urban warfare: **time, information, use of technology, human factors, and decision-making**. We note that nowhere in our literature review were these factors mentioned together and, except for the environmental factor, none were compared across non-urban to urban settings in order to illustrate just how different combat in different kinds of environments can be. Essentially, our examination of the urban warfare literature led us to conclude that these factors are not explored in the detail required to produce a true understanding of what happens to military forces as they leave a more open terrain and head into a city. We discovered that, quite often, the only analysis and discussion surrounding urban combat involves: when to choose to go into a city, how to understand the urban environment, how to deal with civilians, or a list of technical and tactical quick fixes. Prior unit experiences and how these may affect a unit's performance in a city are not addressed. By demonstrating that the five factors we have identified are instrumental across environments, we hope to provide insights into how to better improve capabilities to conduct urban operations.

C. THE PRINCIPAL FACTORS OF URBAN WARFARE

It is our belief that urban warfare is considered complex, costly, and dreaded because, somehow, the urban environment magnifies the effects of **time, information, use of technology, human factors, and decision-making** on forces engaged in combat in urban areas. This magnification, while difficult to measure empirically, appears to impact the effectiveness of units in an urban setting more so than in non-urban environments.

The complexity innate to urban areas is the primary cause for the magnification of the factors and the challenges they, in turn, generate. This magnification of effect creates implications and consequences for fighting forces that are unique to urban combat, even though the factors themselves are not peculiar to urban combat. Understanding the nature of a conflict, as well as having a keen awareness of the enemy, are two essential conditions for waging successful war in any environment. In urban warfare, the ability to

manipulate these key factors relative to the enemy is a third condition for success, success that we define as mission accomplishment characterized by a reduction in overall suffering, damages, and costs.

It is necessary to view the factors of urban warfare not as constants or fixed variables. Their effects and relationships evolve and morph based on actions taken by both sides.² For example, the effects of the factors and their interactions in Mogadishu were completely different on 3 October 1993 than they were on 3 September, and their effects were dissimilar for all the factions involved. The thing to keep in mind is that the effects are relative, and that they will never affect one side in the same manner as they affect the other.

1. Main Hypothesis

If a military does not take measures to mitigate the factors of time, information, use of technology, human factors, and decision-making, and how these interact with the urban environment, it will experience increased friction proportional to the unit's inability to account for them.

2. The Key Independent Variable: Environment

We have broken the environment into two components, the physical terrain and the human environment. Aside from enemy activity, no other dimension of war has a greater impact on organizations than the environment. Perhaps the greatest reason urban operations are regarded as difficult is that cities present the most complex and dynamic environment imaginable for combat. Understanding the foundation of this environmental complexity is essential to understanding how the other factors are magnified.

a. Physical

In terms of military operations, urban environments can be characterized as having a high concentration of large three-dimensional obstacles that limit observation and control of forces, and also canalize movement. The density of obstacles compels militaries to operate in a non-linear fashion with elements that are frequently dispersed

² This implies that friction and enemy activity are linked to the overall effects of each factor. Both friction and enemy actions are inherent constructs in war that can vary in degree based on the action and reaction to the dynamic nature of the operational battle space. We intend, in this study, to illustrate and isolate the interaction of the 5 factors, as well as their interaction with the environment.

and isolated.³ Conversely, a non-urban environment is anything outside of the urban realm. For this study, such environments include deserts, cultivated areas, barren steppes, and jungles.

b. Human

The human component of the environment refers to its societal and ethnic make-up. In regard to military operations, this factor describes the attitudes, allegiances, and behaviors of a population towards forces fighting within the environment where the population resides.

3. The Factors of Analysis

Hypothesis: In cities, the time required to complete basic tasks will increase, synchronizing combat power will become more difficult, and interpretations of objective time will change.

a. Time

For the purposes of this study, we have divided time into three categories: relative, functional, and objective. This is derived from Brigadier General Gideon Avidor (retired) of the Israeli Defense Forces (Avidor, 2003).

(1) Relative Time. Some forces may see time as a constraint, whereas others consider it an ally, and opponents generally judge the effects of time differently because their objectives and planning considerations differ.

(2) Functional Time. This is the amount of time it takes to accomplish a task. Functional time for our purposes will be the different amounts of time required to perform similar tasks in both the urban and non-urban environments. Because different militaries choose to do things differently, there will be differences in functional time. For example, whereas one military trains to send a radio message in 15 seconds to avoid intercept, another may have equipment that prevents intercepts, and thus that military does not concern itself with such a limitation. The importance of functional time comes in a force's ability to synchronize combat power according to timetables. Units that cannot accurately predict the time it takes to perform certain tasks run the risk of disrupting their operational synchronization, which carries with it the consequence of losing tempo.

³ The concept of density of obstacles is first presented by Dr. Russell Glenn, in *Heavy Matter* (2000).

(3) Objective Time. This is time that is the same for all parties involved. This includes time of day, date, and sunrise or sunset. For instance, everyone distinguishes between day and night. One military may only operate during the day and shut down at night. Another military may also only fight during the day, but uses the night to position its forces and refit. These are constants that all sides use and understand. How they are used, however, depends on the military and its objectives, as well as who the enemy is and how it chooses to fight.

b. Information

Hypothesis: In the urban environment, a military will be severely constrained in its ability to collect, process, and disseminate information.

The information factor is embedded in a unit's ability to receive information from the surrounding environment and maintain the systemic integrity that transforms that information into action. The abilities to sense and communicate are the enabling mechanisms for the factor of information, whether by UAV, satellite, or the individual infantryman. This also includes the ability to collect and process intelligence for decision-making, and control and coordinate the activities of organizational assets. This factor also must be understood in the context of human limitations to take in and process information, and how social ties or groupings affect the flow, quality, and use of information.

c. The Use of Technology

Hypothesis: Technology, which includes technical systems and organization, must be tailored to urban settings in order to be effective.

Proper use of technology implies taking the enemy and the environment into account. Clearly, the use (or misuse) of available technology can impact how a military fights and wins. If technology is designed for use in one environment, yet is forced into application in another, can the users of that technology adapt? What effect does the environment have such that it drives those forces to adapt? True technological innovation for the urban environment demands consideration of both the strengths and weaknesses of technical systems, as well as any organizational design built around these systems.

d. Human Factors

Hypothesis: Human limits will be reached more quickly in an urban environment.

Human factors are not addressed in detail in doctrine because they are difficult to analyze. For the purposes of this study, we have selected three areas to examine: Limits of the Human System, Will and Morale, and Ethics and Morality.

(1) Limits to the Human System. There is a limit to the amount of fear, violence, chaos, and uncertainty a person can tolerate. Additionally, the combination of physical fatigue and the human penchant to think in two dimensions places soldiers at a significant disadvantage when they attempt to perform complex tasks in a dangerous and uncertain environment. This may affect the physical, emotional, and sensory stresses combatants endure. Manifestations of this include: physical exhaustion, sleep deprivation, audio and visual sensory overload, and the inability to process information based on these overloads.

(2) Will and Morale. We define this component as the unseen forces that blend together to serve as the foundation for individual and group courage, boldness, resolve, and eagerness to sacrifice and commit acts of violence against other humans. In combat, this is essential to a military force's combat strength. Even though it is difficult to measure, it is vital to take into account.

(3) Ethics and Morality. Violence in warfare is primarily used to physically and or psychologically destroy or defeat an opponent. Without rules to govern this violence, it could grow beyond the control of unit commanders managing it. Extensive combat operations in continuous close proximity to the enemy could affect the discipline of the forces involved wherein acts are committed that violate understood standards of warfare in the Geneva and Hague Conventions. Examples of poor ethics and morality in combat include purposely killing prisoners and other noncombatants, looting, and the indiscriminate or deliberate destruction of civilian property or infrastructure.

e. Decision-Making

Hypothesis: Decisions to prosecute operations in urban areas will be *made* at a higher level than on a traditional non-urban battlefield where the same size forces would operate. Decisions made at higher levels will convolute the decision-making process and chain of command.

Regardless of the level of war, strategic, operational, or tactical decisions are a critical part of planning and execution. We define decision-making as those decisions made at the political and military levels that affect planning, execution, and eventually can be linked to the outcome of a military operation.

(1) Friction As a Constant. When militaries conduct operations in dangerous environments shared by adversaries one of the results of that interaction is friction. In all types of terrain, and across the spectrum of conflict, the presence of friction is understood to be inherent, but varies in degree. The degree of friction experienced by units plays a significant role in determining the magnitude of challenges and costs associated with a given operation. We believe friction to be intrinsic to our factors, and it is the interaction of our factors with the environment that generates friction and degrades operations. Effective mitigation of the factors has the net result of reducing the consequences of friction on friendly units, while increasing the consequences for the enemy.

The interdependencies of human and physical complexity in cities carry with them the potential to intensify friction within military organizations. This urban friction affects both sides, but generally degrades an attacker's effectiveness more than the defender's defense because of the defender's typically greater familiarization with the location.

Friction plays an important role in war waged in any environment. Armies that have difficulty understanding the environment and its effects relative to both friendly and enemy capabilities experience the greatest amount of friction. Understanding the urban environment in relation to enemy disposition is difficult, and thus urban areas typically generate more friction than other environments, although theoretically they do not necessarily have to. Therefore, we feel that in order to reduce the challenges (friction) produced by the urban environment, forces must address the interaction of time, information, use of technology, human factors, and decision-making in ways to account for and exploit the characteristics of the environment relative to the enemy's ability to do the same.

(2) The Role of Doctrine. The absence of doctrine from our list of principal factors does not imply its lack of significance. Indeed, we feel that

possession of a sound urban doctrine may enhance chances for success. More important than mere possession of urban doctrine, however, is the ability to use the doctrine as a means to think about the dynamics involved, and as a means to reduce the equivocality experienced by organizations conducting urban operations. Simply put, the ability to understand and manipulate these factors in an urban context is the basis for urban doctrine.

D. METHODOLOGY

Our study will examine three cases in which the same military operated in both non-urban and urban environments. The environment serves as the key independent variable. The military's performance in each environment is the dependent variable. These factors serve as the framework for analysis and we will see differences in unit performance when we compare across the two environments. As defined earlier, 'urban' refers to fighting that occurred within the limits of the given city, and non-urban is defined as the environment that the military fought in prior to engaging in operations within the city. By keeping the doctrine, unit, offensive posture, and conflict constant, the factors analyzed will reveal the physical and conceptual differences between urban and non-urban environments and demonstrate how the factors not considered in doctrine are magnified.

1. Case Selection

Each case was selected based on the following criteria: First, we only chose militaries with a formally established doctrine for conducting operations. Second, each instance of urban combat needed to occur in a conflict in which offensive operations were conducted by the same unit or a similar unit in a non-urban setting before urban operations were undertaken. We set the cases up in this manner to measure doctrine and unit proficiency in the environment where the unit was more comfortable operating, to then compare these results with that of the same unit as it entered a different environment and set of circumstances. Additionally, we wanted to establish a baseline of performance in each case. For this reason, each case had to have non-urban fighting prior to the urban fighting.

We also wanted to choose cases that would cover the spectrum of conflict from total war (e.g., the German campaign on the Russian Front in WWII) to low intensity

conflict (e.g., the U.S. experience in Vietnam). This was to add relevance to the factors examined regardless of the magnitude of the conflict or campaign. In addition to the spectrum of conflict each case represents, we wanted cases in which the duration of battle differed. Whereas the Russian front case may be measured in months, the Vietnam case is measured in weeks and the Yom Kippur War case is measured in days. Given such differences, we will show that the factors we examine do have an impact regardless of the duration of the operation. Lastly, the cases were not selected because we believe it likely that U.S. forces will have to engage in urban combat under similar conditions; rather, they were selected because they most clearly demonstrate the effects that our chosen factors of urban combat have on military organizations.

2. Cases Selected

- German campaign in the Ukraine, 1942. High intensity, long duration
- Israeli counteroffensive in the Sinai, 1973. Mid intensity, short duration.
- 1st USMC Division operations in the Republic of Vietnam, 1967-68. Low intensity, mid-duration.

We analyze each case according to our five factors. Following the cases, we compare each case, by factor, to identify trends and confirm or deny our hypotheses. We use the results of this comparative analysis to identify conclusions and make recommendations for improving doctrine, technologies, operational constructs, training, and organizational design.

II. STALINGRAD

The name Stalingrad is synonymous with urban warfare. This battle was one of the climactic battles of World War II, fought from September 1942 until the capitulation of the German 6th Army in February 1943. The enormity of the forces involved, the mind-boggling scale of violence, the sheer clash of wills, and the profound strategic significance of the battle's outcome make Stalingrad a classic case in the study of urban warfare.

A. BACKGROUND

The focal units for this case are the 14th and 24th Panzer Divisions (PD) of the German 6th Army. Individual soldier and unit accounts from these units point to the marked differences between the drive across the Ukrainian Steppes in the summer of 1942 and the actual urban combat phase of the campaign later that fall and into the winter. The 14th and 24th PDs were similarly equipped, manned, and experienced divisions. Throughout the non-urban and urban phases of the campaign the divisions worked in conjunction repeatedly, and in some operations elements of one division were temporarily assigned to the other; in essence these divisions were sister units. The other important characteristic of these two divisions is that neither had any operational experience in urban fighting. Throughout the Russian campaign prior to the urban fighting in Stalingrad, these units were used in open terrain to spearhead assaults, exploit penetrations, pursue retreating enemy columns, or act as Army reserves dedicated to counter-attacking Soviet penetrations of the German lines. Comparing the 14th and 24th PDs and their successful drive from the Donets River to the outskirts of Stalingrad to operations inside the city will highlight just how different the urban setting is in the challenges it presents to forces accustomed to fighting in non-urban environments.

Our aim is not to identify or analyze the reasons for the German defeat at Stalingrad. Inability to fight inside cities was only a contributing factor to the outcome. German failure to effectively cut off Stalingrad from Russian reinforcements, Russian counterattacks and fierce resistance, and Hitler's unwillingness to concede the city all

played a greater role in determining the battle's outcome. However, because of the contrast in environments and fighting styles, Stalingrad is a good case to show the differences the environment generates for our 5 factors.

B. THE GERMAN DRIVE ACROSS THE STEPPES

Through incredible leadership, organization, and determination the German Army in Russia was somehow able to survive the terrible winter of 1941-42. Hitler's orders to hold every inch of ground that winter, while initially criticized by his generals, has come to be acknowledged as the key decision in saving the German Army which was unprepared for the cruel realities of the Russian winter and subjected to a series of major Soviet counter-offensives. The German Army found that it needed the spring of 1942 to refit, replace, and retrain an army that had suffered so much during the previous winter (Goerlitz, 1963, pp. 50-56; Liddell Hart, 1948, pp. 188-194).

Hitler was determined to make 1942 the year of decision on the Eastern Front. His strategic aim for that year was the capture of the oil rich regions of the Caucasus. Hitler hoped that the capture of the oilfields and subsequent control of the Volga River would be enough to overwhelm Soviet war production, and thus destroy the Soviets' overall ability to resist. On 1 June 1942 Hitler met with the commanders of Army Group South to discuss the objectives of the summer offensive, "Case Blue". During this visit, Hitler insisted on the capture of the oilfields as the means for ending the war, and hardly mentioned Stalingrad. The only interest in Stalingrad was the need to eliminate its armament factories and secure a position on the Volga River. The actual capture of the city was not considered necessary (Beevor, 1998, p. 70).

The 6th Army was tasked to cross the Donets and drive along the west bank of the Don River, trapping as many of the fleeing Red Army forces as it could. Once the 6th Army reached the Don River, it was to cross it and secure a position along the Volga in the vicinity of Stalingrad, securing the northern flank of Army Group South in order to allow the First Panzer Army and 17th Army to thrust into the Caucasus. Hitler was so confident of success that he ordered the transfer of Field Marshal Von Manstein's 11th Army, the only principal reserve in southern Russia, to participate in the siege of Leningrad (Beevor, 1998, p. 70).

towards the western bend of the Don River that resulted in the entrapment and destruction of Russian forces attempting to move east. Both divisions' records indicate the relative ease in accomplishing their objectives, and the practical impunity with which they beat off Russian counter-attacks (Mark, 2002, p. 1; Stempel, 2002, p. 11). Clearly the Russians were outmatched by the better-trained and equipped Wehrmacht, which was at home fighting on open terrain:

A number of panzer commanders made dismissive remarks about the stupidity of the enemy, leaving tanks halted in the open, and thus presenting perfect targets for Stukas or the 88-mm anti-aircraft guns, deadly in the ground role. They knew the T-34 was overall a much better armored fighting vehicle than anything which Germany had yet produced. On the other hand, its gunsight was not very good, few Russian commanders had decent binoculars, and even fewer had radios. The Red Army's greatest weakness, however, was its poverty of tactics. Their tank forces failed to use terrain properly and demonstrated little familiarity with the principles of fire and movement. And, as Chuikov readily acknowledged, they were incapable of coordinating attacks with Red Army aviation. (Beevor, 1998, p. 94)

One German assault gunner summed up his impression of Russian fighting ability on the open steppe,

The Russians can shoot as much as they want, but we'll shoot more. It's a great pleasure when a couple of hundred Russians attack. One self-propelled assault gun is enough, and they will make a run at it. (as cited by Beevor, 1998, p. 97)



Figure 2. German Panzers Crossing the Steppes (From: Dunnigan, 1978, Plate).

The initial drive to the Don, while successful, did take its toll on the Germans' machinery and equipment. Despite the need to refit, Hitler insisted that the panzers continue east, and it was at this point that the Fuhrer made a complete change to the initial operational concept, by issuing Directive No. 45: the order which tasked the 6th Army to cross the Don and occupy Stalingrad, instead of the initial concept which only required the 6th Army to secure positions on the Volga and destroy the factories within Stalingrad. German generals were shocked at the change of plans. The German Chief of Staff wrote in his memoirs, "The constant underestimation of enemy potential is gradually taking on a grotesque form and becoming dangerous" (Beevor, 1998, p. 80). At this point, the offensive stalled due to severe fuel and ammunition shortages. The pace of the offensive had clearly outstripped the Wehrmacht's ability to bring up supplies, and as the panzers sat awaiting fuel, the Russians took this valuable time to begin concentrating in the vicinity of Stalingrad, preparing to make a decisive stand there. German generals lamented their logistical situation because they knew that Stalingrad could be captured without a fight if they could only maintain the offensive's momentum. Field Marshal von Kleist, commander of the army group advancing towards the lower Don, voiced this frustration to B. H. Liddell Hart during a postwar interview:

The supreme irony of the 1942 campaign was that Stalingrad could have been taken quite early if it had been considered of prime importance. The 4th Panzer Army was advancing on that line, on my left. It could have taken Stalingrad without a fight, at the end of July, but was diverted south to help me in crossing the Don. I did not need its aid, and it merely congested the roads I was using. When it turned north again, a fortnight later, the Russians had gathered just sufficient forces at Stalingrad to check it. (Liddell Hart, 1948, p. 306)

C. STALINGRAD UNDER ATTACK

From 13-20 August, the 14th and 24th PDs crossed the Don and made impressive initial gains to expand the bridgehead. As the two divisions approached Stalingrad, the terrain became more rugged as hills and deep gullies, or *balkas*, became dominant in the otherwise featureless steppe. It was in this terrain that the Soviets committed large forces to delay, disrupt, and attrit the German advance in order to buy time for the forces preparing the defense of the city. As the Germans continued to build up their combat power on the eastern shores of the Don, the recently designated Stalingrad Command

mobilized close to 200,000 civilians, mostly women and children, to turn the city into a fortress while the Soviet High Command continued to rush reinforcements into the area (Beevor, 1998, p. 97). As Stalingrad was being transformed into a killing field, German troops were beginning to realize that their armored stampede across the steppe was coming to an end. Lieutenant Joachim Stempel's reconnaissance platoon for the 14th PD captured the following document from an abandoned Red Army command post, which indicated that the Russians were preparing to stand and fight:

The infantry is to have no fear of encirclement and should know how to take up a defensive ring and break out of it in complete order. When the infantry is encircled, the commanders have to maintain command strictly in their hands. A strong defense in all directions has to be organized, and all measures are to be taken to prevent the enemy splitting up the one encirclement in to many smaller encirclements. The break out from an encirclement can only take place on orders of the highest command authority. It should be carried out in good order and in no case in small groups. (Stempel, 2002, p. 17)⁴

In the same journal entry, the young reconnaissance platoon leader wondered what was in store for his unit and why the defeated Red Army would choose to fight after months of defeat and tremendous casualties, "but our attack draws us closer and closer to the city. What kind of city is this, that is the objective of such fighting and which the Russians do not want to give up at any price?" (Stempel, 2002, p. 17) The Germans had other causes for concern due to the fact that their General Staff, not anticipating the requirement to capture Stalingrad, was woefully behind in planning the operation. The previous year, Hitler had forbidden urban combat in Moscow and Leningrad. German doctrine provided little on the subject of city fighting, and because of this the German Army had little if any training or experience in street fighting (Lewis, 2002, p. 3). However, an overconfident Hitler was determined to capture the city, and could not be persuaded otherwise by his subordinates.

⁴ Joachim Stempel was a reconnaissance platoon leader, staff officer, and company commander in the 14th Panzer Division during the Stalingrad campaign. He surrendered in January 1943 and both he and his diary survived the war. Personal first-hand records of the battle are rare, and Stempel's multiple job experiences show many perspectives of the battle. Stempel's father was also present at the battle as commander of the 371st Infantry Division. In 2002, Hans J. Wijers, compiled the notes and translated them into English.

On 21 August, the 14th and 24th PDs encountered their stiffest resistance of the summer between Lake Tsatsa and Lake Sarpa. The 6th Army's delay for logistics at the Don had given the Soviets an opportunity to coordinate and prepare their defenses outside of Stalingrad. The intent of these defenses was to buy time and wear out the Germans before they reached the city. One of the German engineer officers noted the Russian resistance:

The panzer spearhead moved forward against the lake narrows and there we ran unexpectedly into mines. The whole narrows were mined. Strong enemy defense hindered further progress. We moved out and followed the attack. All of a sudden we were in the middle of a minefield. My pioneer squad cleared 52 mines with 5 men. (Mark, 2002, p. 25)

During the same engagement the commander of the 14th PD reported the following to his corps headquarters:

Hill 87 taken at 0645 hours. Difficult situation because of strong fire out of Tsatsa and the gullies. Cannot go north for the time being. 24th Panzer Division should stand near Point 12.2 Main fire from the east out of the northern and southern edges of Tsatsa. 4 enemy batteries recognized. We must wait until 24 Panzer Division moves up. (Mark, 2002, p. 30)

From the 21st through the 28th of August, both divisions were continuously engaged by staunch Russian defenses, daily counter-attacks, and night raids by the Soviet Air Force. The Germans remained victorious throughout the advance, but slowly their combat power was being worn away.

While the panzers ground their way towards Stalingrad, the Luftwaffe's VIII Air Corps under command of General Baron von Richthofen destroyed Stalingrad proper with the intent of interdicting Soviet defensive preparations and eroding civilians' will to resist. On the 23rd of August, over 1,200 Luftwaffe sorties were flown against the city. During the aerial blitz, incendiary bombs set fire to the city and the massive petroleum stocks in the industrial center. Stalingrad burned for days, and in the process an estimated 40,000 Russians died, most of them civilians. Antony Beevor's assessment of the initial bombings indicates that the effort may have produced an effect detrimental to

German aims, “Richthofen’s massive bombing raids had not only failed to destroy the enemy’s will, their very force of destruction had turned the city into a perfect killing ground for the Russians to use against them” (Beevor, 2002, p. 119).

On the 29th, the dual assault by the 14th and 24th PDs achieved a major breakthrough in the Soviet defenses and again, both divisions rushed deep into enemy territory, maximizing their advantage in mobile warfare and air-ground coordination. This breakthrough took the entire 6th Army to the outskirts of the city. Lieutenant von Senger und Etterlin, a panzer commander in the 24th PD, observed the following during the breakthrough:

We again drove stubbornly for 60 kilometers through drifting dust clouds thrown up 100 meters by our quick advance. The Russian anti-tank guns were pointing at us from front and behind, and I was hit once with a loud crack by an anti-tank rifle. My squadron drove against the flank covered by the smoke screen and only the last vehicle was stopped by a hit. The breakthrough was successful. In a swift drive the armored group pushed through, over hills and gullies deep into the enemy’s hinterland. Villages were being overrun; unsuspecting Russian supply lines were cashiered. The armored group irresistibly forced its way through and sometimes when we were moving forward and drifted further apart, we attacked in force and came together to move forward...Once, through the glassy glimmer lying over the steppe, I saw somewhere far to our right the other Panzergruppe likewise driving over the hill with us. That must be the spearhead of the 14th PD. (Mark, 2002, p. 88)

Throughout the Stalingrad sector, German units raced across the steppe towards the city under the constant cover of the Luftwaffe. The 14th and 24th PDs began to penetrate the outskirts of the city during the first week of September 1942. To the typical German soldier, it appeared that the hard summer’s offensive would end soon with a quick capture of Stalingrad.

1. The German Assault into Stalingrad

Stalingrad was a key industrial city located on the western bank of the Volga River. Bordered by barren steppe to the west and water to the east, Stalingrad’s elongated nature ran roughly north to south following the banks of the Volga. The narrow city, with a pre-war population of 600,000, was no more than four kilometers wide and in some areas was less than 2 kilometers wide. The city was bisected by the deep gully, Tsaritsa Balka. The other major natural terrain feature in the northern portion

of the city was the old Tartar burial mound at Mamayet Kurgan, a hill some 102 meters high that overlooked the entire city and the Volga (Spiller, 2000, pp. 61-62). South of the Tsaritsa Balka was the bulk of the residential area. Following the Luftwaffe incendiary attacks, much of that portion of the city was burned out, and all that remained were rows of brick chimneys, which reminded the German soldiers of gravestones (Mark, 2002, p. 176). The other two significant features of southern Stalingrad were the main train station and the ominous and massive grain silo, which dominated that portion of the city. Northern Stalingrad was primarily industrial. The Mamayet Kurgan dominated the northern city part of the city and provided a tremendous vantage point for the industrial sprawl created by the oil storage facilities and four major factories: the Lazure Chemical Plant, Krasny Oktyabr Metal Works, Barrikady Weapons Plant, and the Dzhirzhinskij Tractor Works (Spiller, 2000, pp. 61-62). The combination of Luftwaffe bombing and the labor of Russian civilians transformed Stalingrad into a fortress of twisted steel and concrete, interconnected with bunkers, sniper positions, and trench systems. No longer did anyone, soldier or civilian, live above ground. Stalingrad was a man-made nightmare before the battle was even joined.

The city was defended by the remnants of the Soviet 62nd Army under the command of General Vasili Chuikov. The 62nd Army had spent the summer fleeing from the German onslaught, and found itself with only 20,000 troops to defend the city. Stalin made it clear to Chuikov that the retreat was over, and any further withdrawal would be tantamount to a crime against the state (Spiller, 2000, p. 61). Chuikov, realizing his desperate situation, made wide use of directly subordinated NKVD police units to control all access into and out of the city.⁵ He terrorized his own officers and, recognizing the need to slow the German advance, conveyed his brutally harsh and simple intent to his army: “Time is blood” (as cited by Beevor, 1998, p. 128). All the Russians had to do was hold their ground and kill Germans, and Chuikov was clever enough to understand that the courage, tenacity, and hardiness of Russian infantry could be fully maximized in the close quarters battle of urban combat.

⁵ The NKVD, one of the predecessors to the KGB, provided communist party-controlled police “services” to the Red Army. Just before Stalingrad, the Soviet High Command convinced Stalin to subordinate the NKVD to local Red Army commanders.

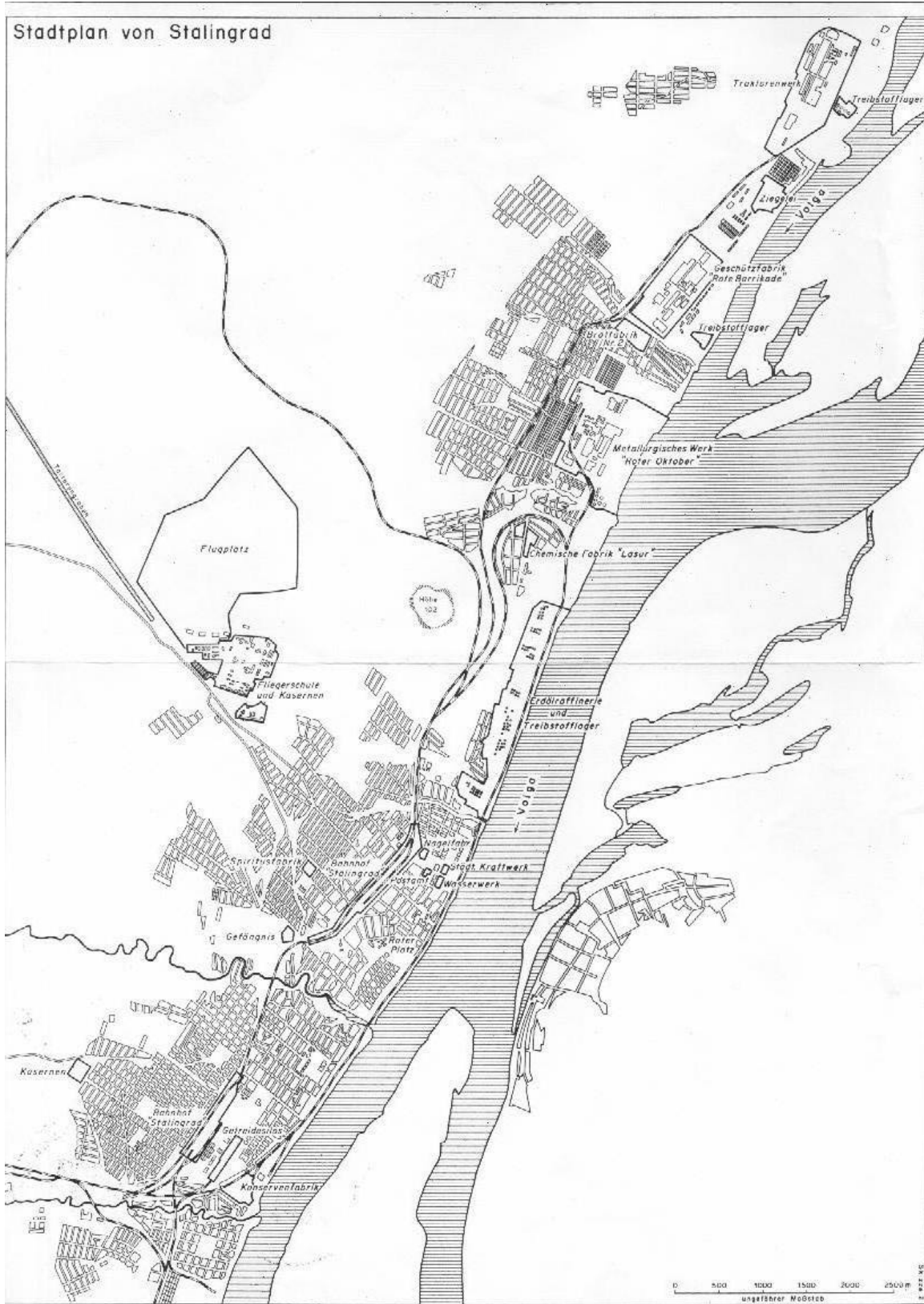


Figure 3. Stalingrad, August 1942 (From: Stalingrad Battlefield Info).

On the 6th of September, the 14th and 24th PDs had planned to assault into the southern portion of the city. However, the depleted divisions required more time to refit and rearm, and consequently the attack was delayed. These delays, while necessary, gave additional time to the Soviets to reposition, prepare, and conduct reconnaissance. The Russians took advantage of the German delays to bombard and disrupt the German assembly areas and lines of communication (Mark, 2002, p. 131).

Using the Tsaritsa Balka as an anchor on the left flank, the 24th PD was tasked to move east into the city, clearing through the burned out residential areas with the objective of securing the railway which ran north to south. The 14th PD simultaneously was to launch an attack on a parallel axis in support of the 24th PD. The remainder of the 6th Army continued to pressure the central and northern parts of the city, and the 389th Infantry Division (ID) attacked to seize the Mamayet Kurgan (Hill 102). All the while, the Luftwaffe continued to pound the city, and the Germans quickly realized how difficult air-ground coordination in urban environments could be. On several occasions, Stukas bombed the front line advance of both the 14th and 24th PDs (Mark, 2002, p. 119).

Prior to the attack, General Hoth, commander of the 48th Panzer Corps, issued the following guidance to his panzer commanders, which was to have far-reaching consequences in the coming weeks:

Wherever the panzer forces are *employed closely compressed with concentrated strength, the attack is a success*. The new regrouping of the Corps will and must lead to success. That the enemy – pressed back into a narrow area – will offer considerable resistance is certain. (as cited by Mark, 2002, p. 128)



Figure 4. German Tank Outside the Factory District (From: Stalingrad Battlefield Info).

The first push by the panzer divisions commenced at 0330 hours on 8 September without the use of a preparatory bombardment. This move caught the Russians off guard, and both divisions were able to gain substantial ground in the suburbs. But, as the sun rose in the city, the panzer formations soon proved vulnerable. Flanking anti-tank fires from pockets of Russian infantry and mines knocked out 33 total panzers from the 14th and 24th PDs, with the casualties including a large number of experienced leaders (Mark, 2002, p. 139). German advances were modest for the remainder of the day and the attack continued until the 14th of September, when the German commanders concluded that the city was invested minus the Volga, and a satisfactory foothold was established within the suburbs.

From 15 – 22 September, both divisions worked hard to establish control of the southern portion of the city. As anticipated, Russian resistance was fierce throughout, but the speed of the initial panzer thrust and the constant pressure placed on the Russians did not afford the Soviets an opportunity to regroup. The 24th PD was the first unit at

Stalingrad to achieve its initial objectives, and it was followed closely by the 14th PD. Lieutenant Stempel of the 14th PD recounts his impression of the initial drive into the southern portion of the city:

At our brigade command post it is broadcast in the “evening briefing” that the Stalingrad railroad station has just been captured, and this time once and for all! In five days it was evacuated and retaken fifteen times by the Russians. But now it is securely in German hands. And with this the majority of the southern edge of the city has been taken! All except for one building, that rises from the southern edge of the city and is towering over everything. It is a giant grain elevator – there a bitter fight still rages. (Stempel, 2002, p. 39)

The battle for the grain silo was the first tough test for the Germans, and clearly demonstrated the difficulty in rooting out staunch defenders from dominant urban positions. Fifty-odd men from the Russian 35th ID defended the grain silo, and on 18 September they beat off ten German assaults. After three days of fierce fighting, and efforts by elements of three German divisions, the remaining defenders broke out under the cover of darkness (Beevor, 1998, p. 140). The pyrrhic nature of the victory is captured in Stempel’s memoir:

The fighting, no the wrestling here, is yard by yard. It really is a bestial battle for every bit of ground, for each undulation in the ground, each gully. The losses it brings are unimaginable – on both sides! Everything here is unbelievable, it surpasses everything seen before! And our artillery fire of all calibers and our bombing attacks tear into this – without pause. Directly behind us the division artillery is firing overhead, likewise the rocket launchers, who with their “screaming and moaning” make even us old fighters jump into the nearest hole for cover. And then – out of the blue sky and without any prior warning – Soviet artillery and Stalin organs impact among us! And then the brigade commander gets the report: “The grain elevator has been taken!” First a battalion attacked there and finally – after five days – it is parts of three German divisions that today, September 22nd, have finally taken this important point, the grain elevator. (Stempel, 2002, pp. 42-43)

On 24 September, Hitler sacked General Halder, Chief of the Army General Staff. Increasingly frustrated by the slow progress and high costs of operations in southern Russia, Hitler blamed his generals for operational and tactical difficulties. Hitler replaced Halder with the sycophantic Field Marshal Keitel, referred to by professional officers as “Lakeitel” or the ‘nodding donkey’ (Beevor, 1998, p. 145). At this point, Paulus lost his

only ally between himself and Hitler and, despite the setbacks, heavy casualties, and worsening operational situation, Hitler demanded that Paulus seize Stalingrad immediately, and refused to rotate or redirect forces out of the Caucasus to assist in the effort at Stalingrad. On 30 September, in a speech given at the Berliner Sportsplatz, Hitler left no doubt about his intention at Stalingrad: “no man will shift us from this spot” (Beevor, 1998, p. 164). Already suffering from the strain of combat coupled with continuous fits of dysentery, this pressure from above took its toll on Paulus (Beevor, 1998, p. 146). Paulus’ only hope was that Stalingrad would fall quickly, and thus he transferred his personal pressure down the chain to his division commanders.

Having secured the southern portion of the city, the 24th PD was transferred north to assist in the capture of the airfield and Hill 102 (the hill changed hands several times during the initial penetration). The 14th PD was also pulled out of the city to reinforce a Rumanian army protecting the flank of the 6th Army. The Russians were keenly aware of the weaknesses of the German allies, and made three concerted offensives against these lower quality troops to relieve some of the pressure on Stalingrad. At a key point in the battle, the Germans found themselves transferring assets back and forth, in lieu of adhering to their doctrine which demanded that they concentrate all their power and effort at the *schwerpunkt*: point of decision. Strategically, the Germans were also violating this principle due to their insistence on simultaneous campaigns in the Caucasus and at Stalingrad.

With the southern sector of Stalingrad fairly secure, the 6th Army decided that the time was right to finish off Soviet resistance and seize the northern industrial sector. On the 27th of September, the German offensive against the factory district began. The 24th PD assaulted along the northern outskirts of Stalingrad, seizing an airfield and the key high ground, which overlooked the industrial district. Again in open terrain, the 24th PD experienced tremendous success in penetrating and exploiting Soviet defenses. Once the high ground was firmly in German possession, elements of the 24th PD were assigned to assist the 100th Jaeger Division capture the Krasny Oktyaber Metal Works. The combined efforts of these two divisions eventually succeeded in capturing the Krasny Oktyaber, but the success came at the cost of the division’s infantry strength within the panzer grenadier regiments. These losses forced the German command to commit the

276th infantry regiment from the 94th ID to shore up the 24th's losses (Mark, 2002, pp. 245-260). Unfortunately, these two units were unfamiliar with each other and lacked the experience necessary to coordinate infantry and tank attacks, and the biggest attacks were yet to come. Meanwhile, instead of lending support for the seizure of the factories, the 14th PD was called away again to defeat a Soviet attack to the south of Stalingrad, which succeeded in penetrating the 11th Rumanian Corps' defenses (Stempel, 2002, p. 45). As soon as the integrity of the Rumanian defenses was restored, the 14th PD returned to northern Stalingrad to begin the final push against the industrial district.⁶



Figure 5. Germany Infantry Force Their Way Through “Red Barricade” (From: Carell, 1991, Plate 207).

2 The Fight for the Factories

After a short pause to coordinate the line of defense and replenish losses, the 24th and 14th PDs took the lead in the assault of the two significant remaining Soviet pockets of resistance at the Barrikady Gun Foundry and the Dshershinskj Tractor Works. The 24th PD, the 108th Panzer Grenadier (PG) regiment of the 14th PD, and elements of the 94th ID assaulted to seize the gun foundry, while the remainder of the 14th PD and the 60th Motorized ID attacked the tractor works. For the next three weeks, both panzer divisions were consumed by the most horrific urban combat imaginable. The struggle for the factories ceased to be a battle of maneuver, coordination, and in some respects firepower. Instead it simply became a battle of wills. The close proximity to the Volga River, in some cases only fifty meters away, strengthened resolve on both sides, resulting in a

⁶ Stempel's records indicate that the diversions made outside the city to assist the Rumanians lasted only a couple of days and did not result in many casualties for the Germans. However, the fact that units exhausted by weeks of city fighting were redirected may indicate that the Germans had overcommitted their combat power inside the city as well as lacked faith in the capabilities of their allies.

fixed positional war of attrition, the type of war that favored the Russians, and one in which the Germans were neither trained nor equipped.⁷ During the summer blitz, both panzer divisions measured objectives in terms of kilometers, but in the fight for the factories, each division measured progress by meters and by individual buildings. The compression and concentration of combat power from kilometers down to meters completely mitigated the German technical and doctrinal advantages in tanks, infantry, and coordination, and the close proximity of the fighting ensured the inevitability of heavy casualties for all participants.

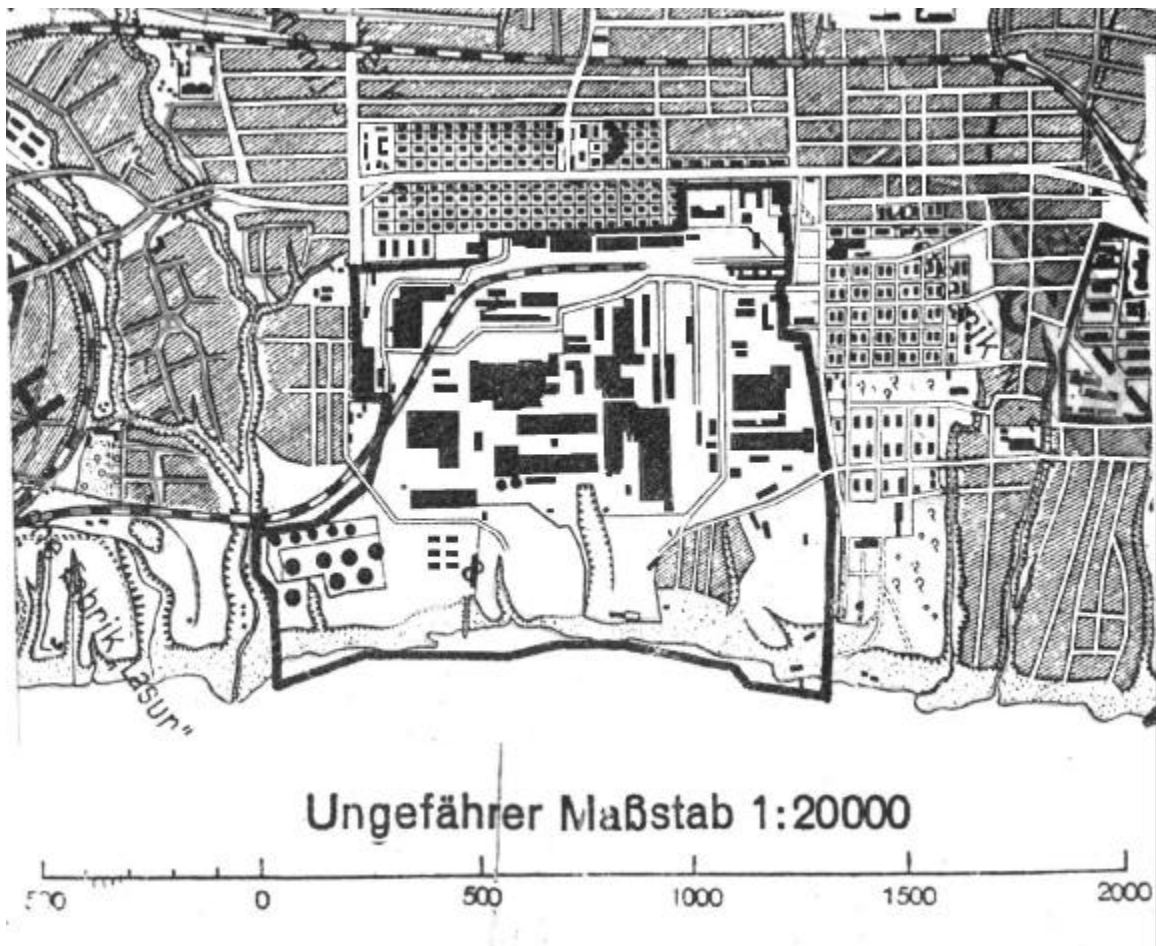


Figure 6. The Factory District (From: Stalingrad Battlefield Info).

⁷ S.J. Lewis, in an interview conducted in March 2003, stated that by the end of 1941, nearly 90% of German combat engineers had been lost. During the spring of 1942, many infantry units had to be “retrained” as engineers.

Lieutenant Stempel, since reassigned to command a company of panzer grenadiers in the 108th PG regiment, recounted the fighting in the factory district:

Meter by meter we advance slowly. We take hours to reach the next objective! Set up covering fire – work our way forward – covered, pressed close to the earth and using each and every, even the smallest possibility of cover. And we continuously look around us, where are the Russians lurking? And there we again see them – directly in front of us – at only 50 meters – the heads of the Red Army men! Earth brown as everything that has been left here. Things blast brightly and the stuff flies round our ears! Again losses through dead and wounded! My God, how many will it be today that have to be recovered and dragged back tonight in the darkness? To the right of us the riflemen attack again! We can hear them, their cries and their firing. And over us all the smoke of the burning buildings, of the oil tanks to the left of us and the glowing remains of the factory halls. And then all of a sudden – again our Stukas are coming up! We fire off white flares, so they are immediately able to recognize our forward lines and are able to drop their bombs on the enemy as close as possible to us. And now – everywhere white and yellowish flares rise to the sky. Everywhere “Here we are!” How can the planes possibly recognize where the German outposts are? So they curve and circle – and then all of a sudden go into a dive. With a deafening howl of sirens they come diving down! Far in front of us, directly in front of us, and my god, also behind us! New giant craters are made, smoke-and dust clouds as well as the dirt of fountains of earth darken the terrain and temporarily darken everything! Visibility nil. Now all of a sudden machine gun fire! Independently from the various groups. Cries, shouts – engine noises. Counterattack by the Soviets! And there I can make them out. 30 or 40 meters in front of us – bent over, quick- without steel helmet, all just wearing caps. Now we’re covering them with fire from all weapons. And we need an artillery barrage! Red flares! Quickly, quickly! And there it comes in howling, our artillery blocks it off. Mortar projectiles whirl and whistle, surprisingly, they are there! Taking cover now has no use!

Hours flows into hour [sic], day into day of bitter fighting. And on the 27th of October we assemble again. Though tired, fought to exhaustion, we still have the will to force a decision. Immediately after breaking cover, dead and wounded in the first few meters! And down! Cover! Where are the guys that fire on us? From where is the damned fire coming? (Stempel, 2002, p. 77)

Forced into such combat by the nature of the environment, the effectiveness of German mobile doctrine was rapidly eroded. Tank battles in and around the factories

ceased to be coordinated in any way, and instead pitted individual tank crews against squads or, in some cases, individual defenders. In his memoirs, Chuikov wrote about the nature of tank divisions in urban combat around the factories:

.... on the 16th of October, masses of enemy infantry, supported by tanks, swooped along the road from the Tractor Factory to the Gun Factory. This large-scale, determined attack came up against the 84th Tank Brigade's tanks, which had been dug in. And to the west of Tramvaynaya Street our tank crews met an enemy attack with concentrated fire from a distance of 100-200 meters. Ten or more enemy tanks immediately went up in flames. The German attack petered out. At that moment our artillery on the east bank opened up blistering fire on the enemy's halted tanks and infantry.

Being a long way from the field of battle, and not seeing what was happening on the sector of the main attack, the German generals sent up more and more fresh units, which rolled up to our lines in waves. Here they were stopped and were pulverized by powerful salvos from our 'Katyusha'. The German tanks coming under fire from our well-camouflaged T-34's and anti-tank guns turned back and abandoned the infantry. (as cited by Mark, p. 281)⁸

Through the end of October, both panzer divisions fought viciously for control of the factories. However, Russian determination was up to the challenge; all that any side accomplished was increased attrition and suffering. At the end of October, the 14th and 24th PDs, completely exhausted, pulled out of the fight for the factories and occupied positions in some of the more "quiet" sectors of the city. Their objective was simply to defend previously seized objectives. However, even here they were subjected to Russian counter-attacks, barrages, and snipers. Accounts from both divisions at this point in the battle indicate that there was little combat power left, and for the first time doubt began to formally set in regarding German chances for success before the onset of winter (Mark, 2002 ; Stempel, 2002).

The predicament of diminishing German combat power was compounded by the fact that Germans were never able to completely isolate Stalingrad. The Russians were

⁸ Mark states that Chuikov's account, notorious for exaggerations, is corroborated by German records (Mark, 2002, p. 281).

consistently able to get reinforcements across the Volga River. These Russian efforts ensured that Chuikov's forces had "just enough" combat power to keep the Germans tied to the city (Beevor, 1998, pp. 159-160).

At the strategic level, Hitler refused to see the reality of the battle, or the indicators of a Soviet encirclement that became more and more evident with the passing of time. On the 17th of November, Hitler issued another order to the 6th Army demanding the attack continue:

The difficulties of the Battle for Stalingrad and the lowered combat strengths are known to me. The problems of the Russians with the current ice forming on the Volga are even greater. So when we use this span of time, we'll save a great deal of blood later. Therefore I expect that the leadership, with all previously demonstrated energy, and the troops, with often proven determination, will once again give their all in action to break through to the Volga, at least near the Gun Foundry and the Metallurgical Works, and take these parts of the city. The Luftwaffe and artillery are to do everything in their power to prepare and support this attack. (Stempel, 2002, p. 94)

Paulus, obviously full of "previously demonstrated energy" and perhaps some cynicism, relayed the Fuhrer's order with some of his own guidance, "I'm sure, that these orders will give a new impulse to our brave troops" (as cited by Stempel, 2002, p. 94). But the troops at this point had little or nothing left to give. Aside from minor attacks or an occasional reconnaissance in force, the 6th Army was forced to assume a defensive posture in and around the city.



Figure 7. Soviet Infantry in Stalingrad (From: The Urban Operations Journal).

3. Encirclement and Capitulation

By this point, the battle for the city was strategically and operationally insignificant. Massive Russian formations had been secretly building up combat power north and south of Stalingrad, and on the 19th of November, General Zhukov launched Operation Uranus, a two-pronged offensive designed to destroy the Rumanian and Italian Armies, protect the flanks of Stalingrad, and encircle the 6th Army. Operation Uranus commenced at 0500 with massive bombardments against the Rumanian and Italian positions. Shortly thereafter, the lead elements of the Russian attack were across the Volga and, by midday, organized Rumanian and Italian defense ceased. That afternoon Soviet formations made tremendous gains against fleeing resistance. Clearly, this was a major Soviet counter-offensive designed to encircle the 6th Army, and the success of this operation had a major effect on the outcome of the city fight.

The lack of a German response was surprising. It appears that Paulus' command was not even aware of the scale of the offensive until mid-afternoon on the 19th. Despite the Germans' lack of situational awareness they were not in a position to do anything to stop the Soviets anyway. Stalingrad had so consumed the 6th Army that Paulus failed to organize a mechanized strike force before the attack, and without a ready-made and designated force to thwart the Russian penetration, there was nothing to prevent the link

up of the two Soviet armies. Lieutenant Stempel's company in the 14th PD would have been a logical force to move against the Soviet offensive, but it was bogged down in the heart of the city, incapable of breaking contact, and completely in the dark. This report came out of Stempel's diary dated 19 November 1942:

It is already 0730 hours this morning. We are standing by tensely, concentrated on the attack. But no orders to prepare for the attack come. No support – whether from the air force or by our artillery – is noticeable. And the engineers that had been promised to us for this attack do not arrive! On the other hand there is much excitement and hurrying in the battalion staff! But no explanations and information get through to us. Only indications of a situation that has changed completely. What's the meaning of all this, what has happened, that our attack cannot be launched?! We continue to stand by in our extended holes in the earth and positions, look towards the east – into the unknown. Even now, when darkness falls – we know nothing. (Stempel, 2002, p. 95)

Even had the 14th or 24th PD been given orders to leave the city and counterattack the Soviet offensive, it is unlikely that either division would have been able to do so. By 19 November, both divisions had fewer than thirty functional tanks and little fuel to support even that small number (Beevor, 1998, pp. 246-250). By the afternoon of 21 November, the lead elements of two Soviet armies linked up in the vicinity of the Don River crossing at Kalach; the 6th Army had been encircled.

Hitler refused to authorize a breakout attempt at Stalingrad even at this point. The city had become a symbol to Hitler and the German people, a symbol that was bound up with the fate of the Third Reich. Retreat from this city meant admitting that the Germans could be defeated, and despite the lunacy of holding positions in Stalingrad, Hitler gave the following order on 27 November:

The Battle for Stalingrad is reaching its climax. The enemy has broken through into the rear of the German forces and now is desperately trying to regain possession of this vitally important bulwark on the Volga.

With me the thoughts of the German people are with you in these difficult hours. You'll have to hold the positions in **STALINGRAD**, which you conquered under the command of such capable generals. It has to be our unwavering determination that, like Kharkov in the spring, this Russian breakthrough will lead to his destruction through measures already undertaken.

Whatever is in my power is being undertaken to support you in your heroic battle. (Beevor, 1998, p. 107)

For the next two months the 6th Army remained trapped at Stalingrad. The Luftwaffe conducted a massive aerial resupply operation, but its efforts fell far short of the army's requirements. Unable to provide for itself in the middle of a Russian winter and under relentless Soviet attacks, the 6th Army capitulated on 3 February 1943; 91,000 prisoners were taken.

All-told approximately 250,000 Axis troops were lost at Stalingrad along with 1,000 tanks, 1,800 guns, and hundreds of aircraft. Of the losses, 150,000 were killed or wounded by January 1943 (Lewis, 2002, p. 21). The losses to the Russians, both military and civilian, while officially unknown, were estimated to be greater than the losses suffered by the Germans, but in the end Stalingrad had not been taken. A summer of mobile warfare that had generated such success and optimism turned into a fall and winter house-to-house fighting in the streets and rubble of Stalingrad, leading to the total destruction of the largest field army in the Wehrmacht.

D. COMPARATIVE ANALYSIS: GERMAN ADVANCE TO STALINGRAD AND THE BATTLE OF STALINGRAD

1. Environment

a. Physical Terrain

The distinctions in terrain between the advance to Stalingrad and the urban portion of the battle had significant effects on the outcome of each operation. The physical density of objects, events, and obstacles easily accounts for these differences. There appears to be a correlation between the number and density of objects in the urban and non-urban environments and the amount of friction experienced by the Germans.

The physical environment during the advance to Stalingrad was characterized by vast open steppes, agricultural land, and farming communities. On two occasions the terrain was broken up by major rivers, the Donets and Don. Closer to Stalingrad, hills and deep balkas provided some relief in the terrain. However, even in this more broken terrain, line of sight, engagement distances, maneuver space, and ability to coordinate and control forces were barely affected. Essentially, the Germans found themselves in a near-ideal environment to exercise their doctrine of mobile, combined

arms warfare. Aside from terrible dust and sand that presented a maintenance challenge for a mechanized army, and the long distances required to be covered by logistical assets, the terrain between the Donets Basin and the outskirts of Stalingrad was essentially ideal for a panzer commander. Accounts from both the 14th and 24th PDs echo this sentiment:

East of the Donets to the Don steppe and the Kalmuck steppe the wide agricultural grounds here have already yielded to the steppe. East of the Don, only the steppe awaits us. The ground is flat, without any higher ground. It is devoid of trees and possesses a depressing boredom. Heat, dust and wide spaces without shadow! To the horizon nothing is visible that draws attention to itself. A heat of over 50 degrees centigrade – the desert must be like this. All the while we are of course thinking how this will look in winter. Snow, winter storms, icy frost! Don't think about it. Not now, while we're sitting on our motorcycles all sweating. Driving does not offer any relief either. Heat and dust, nothing else. (Stempel, 2002, p. 6)

Group Hellerman, a reinforced battalion of the 24th PD, occupying an area covering 25-kilometers while protecting the flank of its parent division, described the terrain during the advance east:

In 58-degree heat and continuous dust storms, we advanced further through the Kalmuck steppe toward the northeast. For days on end there are no human settlements, the earth is bare, burnt black and heat waves rise into the air. There are no roads. We drive with the march compass over the hills. The Kalmuck steppe has swallowed us up. (Mark, 2002, p. 8)

In this type of terrain the Germans were able to take advantage of their superior tactics and weapons technologies. The Russian T-34, commonly acknowledged as superior to any German tank at the time, lacked the sophisticated gun sights and optics to be successful against the Germans in this open terrain, and the Germans were generally able to mass tank fires or use the long-range capabilities of the 88mm flak cannons to defeat the superior Russian armor. Conversely, the lack of sophisticated fire and maneuver tactics and combined arms doctrine within the Soviet structure placed Soviet forces at a serious disadvantage when fighting the panzer formations on the steppe.

The open terrain allowed the Germans to maximize the use of the Luftwaffe's capabilities. Aerial reconnaissance was able to locate Russian formations far to the front of the advancing panzers, and close air support provided by the Stukas was

extremely effective and well coordinated. In fact, the steppes were so dry and hard that on numerous occasions, planes would land right behind the panzer formations to deliver supplies, drop off key personnel, or evacuate casualties.

The open terrain also ensured that the Germans could effectively mass combat power without masking any assets. Visibility was so good that German commanders often reported being able to see the elements of other divisions off in the distance. Commanders with this sort of situational awareness clearly had an advantage in gaining early and accurate intelligence and coordinating fires. The occasional hill or balka did present some challenges to the Germans, but because these features afforded the Russians the only protection for miles it became predictable to expect the Russians to defend them thereby making it easier for the Germans to deploy into battle formations and employ devastating air and artillery fires. Finally, Russian counterattacks in the open terrain were quickly beaten off on nearly every occasion.

Within the limits of Stalingrad the terrain changed completely; the urban environment nullified many advantages that the steppe offered for a panzer division. As previously mentioned, the city was elongated and extended some 56 kilometers pinned against the Volga. The city, comprised of many small dwellings, apartments, shops, and stations, was dominated by the heavily constructed northern industrial district and the nearly impregnable grain silo to the south. Luftwaffe raids that preceded the ground attack burnt and “rubbled” the city, but this only served to increase the number of obstacles. The broken terrain of a bombed-out city created numerous concealed firing positions, masked the movement of troops, and offered tremendous protection against direct fire and high explosive weapon systems. Additionally, the city could never be completely isolated because it ran along the Volga, and while the Germans made many attempts to interdict the traffic on the river, they were unsuccessful in completely isolating the city from outside support. The failure to isolate the city from outside support ensured that the Russians could keep feeding fresh troops into battle whereas the Germans were unable to.

Some of the physical terrain challenges experienced by the 24th PD are captured in a compilation of lessons learned and suggested techniques for city fighting:

Terrain difficulties such as house ruins, bomb craters, narrow streets, minefields, tank barriers and obstacles largely limit the maneuverability and observation possibilities of panzers so that in principle, operations of panzer units in city combat must be avoided. The casualties received bear no comparison to the success of this most valuable weapon system of the army. The main weapon of the panzers, ‘fire and movement’, cannot be used properly. They present a target and see very little. The panzer is not suited for city fighting when operating in units such as a Panzer Regiment or Abteilung. On the edge of the city and in completely disintegrated sectors of the city, panzer operations are often useful. (Mark, 2002, p. 327)

The challenges of the terrain were not limited to the panzers. Artillery units had difficulty spotting and adjusting rounds, and the low trajectories of heavy artillery made them less effective in engaging targets masked by multi-story buildings. Infantry units had numerous difficulties as lines of sight became minimal, and the enemy became harder to detect. The man-made and man-altered aspects of the terrain were also particularly harsh on infantrymen trying to maneuver or assault through it:

The corporal in fully torn up and muddied uniform takes me – in bounds – in the direction of the “Front” to the battalion command post. Over mountains of rubble, through collapsed buildings and through the remains of halls and factories. And everywhere projectiles strike the walls still standing. Onward, onward! Over shattered rails, through hollows with loose stones and iron beams that have come down, then again through factory halls, in which parts of machines, work benches and material of all sorts lie around, toppled, destroyed. From the iron girders that are still standing are hanging wavy metal plates and wiring. (Stempel, 2002, p. 69)

The sheer number of obstacles, firing positions, and areas to observe, coupled with a general inability to see more than one hundred meters, forced units to compress their formations and operational battle space. The compression of combat power with decreased situational awareness and decentralization of operations increased the friction between units, and forced attrition tactics due to lack of any maneuver room. This compression of combat power, caused in part by the complex and difficult-to-control environment, only added to the problems of operational control.

b. Human Environment

For the most part, the terrain during the drive to Stalingrad was devoid of human settlement and civilian populations. The lack of civilians eased German operations considerably as they did not have to overly concern themselves with refugee

or partisan activity. For the civilians who did occupy the steppe, many were extremely friendly to the Germans. Many of the Cossacks of the Don Basin were vehemently anti-Communist, and willingly offered support to German forces, despite the German propensity to loot along the way. The remaining civilians also had cause to side with the Germans. Having been ordered to burn their villages and evacuate their families with the retreating Red Army, the Cossacks realized their defiance of this order would eventually lead to their death if the Germans were unsuccessful. Front line German troops enjoyed these warm relations with the locals. A German company commander wrote in his diary, “To be honest, people give everything they have if you treat them correctly. I have never eaten so much as here. We eat honey with spoons until we’re sick, and in the evening we eat boiled ham” (as cited by Beevor, 1998, p. 88).

In contrast, the civilians of Stalingrad—some 200,000 of them—were less than pleased to see the 6th Army. Terrorized by the NKVD who forced them to remain within the city, and enraged by the Luftwaffe firebomb attacks, the civilian population was not about to hand out anything to the Germans except punishment and revenge. Civilians dug trenches, anti-tank ditches, and berms, and many of the women and children took up arms against their invaders (Beevor, 1998, p. 98). German operational and logistics problems left them with little patience or resources for civilian battlefield management, and essentially there were no rules of engagement. The combination of terror tactics by the NKVD, patriotism, and no better option offered by the Germans, created a fervent resolve in the civilian population to resist. This resolve is captured in Stempel’s diary:

The inhabitants of Stalingrad fought in the ranks of the Soviet forces. The workers of Stalingrad labored day and night despite the murderous bombing attacks and the incessant artillery bombardment of the city. Even when the enemy was less than a kilometer from the Tractor Works and the enemy’s guns were firing at it over open sights, the work in the factory halls was not stopped. In these horrible days the factory reached its highest productivity of labor and daily built dozens of tanks, which rolled straight to the forward positions from the factory gates. Their crews were the workers that had built the tanks. Yes, it was like that day-by-day. The resistance grows stronger; the fight is carried out without mercy. (Stempel, 2002, p. 30)

The dynamics of the physical and human aspects of the urban environment varied greatly from those of the non-urban setting, and these differences account for the tremendous magnification of our other key factors. German failure to understand the effects of this magnification, and apparent inability to reduce it through proactive measures, appeared to make their operations less effective and more time consuming—time in which the Soviets used to prepare for Operation Uranus and the eventually entrapment of the German 6th Army.

2. Time

The Stalingrad campaign offers a great instance in which to examine the relationships between relative, functional, and objective time in both urban and non-urban environments. All three components of time created effects of different magnitude in each environment, and these effects were linked to the levels of friction, uncertainty, and equivocality experienced by the Germans.

a. Relative Time

During the summer drive towards Stalingrad, a slight advantage in relative time belonged to the Soviets. The Germans hoped to decisively cut Moscow from its oil reserves in the Caucasus before the onset of winter. The German High Command believed that this action would be enough to convince Stalin to capitulate. The distances required to achieve this objective were tremendous and the need to push quickly to the Volga was obvious, so obvious, in fact, that German logistical assets had great difficulty in keeping pace with the advance. Consequently, the momentum of the offensive was halted numerous times due to lack of fuel. The Germans were also very aware that they had in fact lost two months of campaign time in April and May due to the necessity to rebuild their forces after the disasters of the preceding winter (Beevor, 2002).

The Russian view of time was much different for this phase of the campaign. Initially, surprised by the German decision to make the main effort in the south, STAVKA was forced to quickly reposition assets from around Moscow to Stalingrad. Additionally, given Russian mobilization plans, reinforcements from Asia needed time to train, equip, and position to effectively counter the German offensive (Beevor, 2002). The common thread in relative time between the two sides was preparation of the defenses at Stalingrad. After the Germans crossed the Don, the

Russians stopped retreating. They fought tenaciously in the hills and balkas outside of Stalingrad, and launched repeated counterattacks to wear down the Germans and buy time for the 62nd Army to prepare Stalingrad for the decisive battle. The delays caused by Russian actions in early to mid- August prevented the quick capture of the city.

During the urban portion of the campaign, the differences in relative time were most pronounced. The Germans were keenly aware that a quick capture of Stalingrad was necessary to allow them to cut the Volga and shore up their defensive positions along the river before winter. The Germans were also concerned that any major delay in the capture of Stalingrad could threaten the northern flank of units moving into the Caucasus. It appears that the sharp difference in relative time drove the Germans to commit more and more forces to Stalingrad while the Soviets simply had to maintain enough force in the city to achieve their objectives. With each attack, it appeared to the German commanders that victory was just one more push away, and that all that stood between the 6th Army and the last 100 meters to the Volga were a few Russians and the requirement for just a couple more regiments of German infantry. Indeed, German perceptions of relative time may have been the principal reason why the Germans committed so much combat power to assault and capture Stalingrad and the defeated remnants of a broken 62nd Army. It is interesting to note that no such time constraints were placed on the forces besieging Leningrad during the same period. The Russian view of relative time is simply captured in Chuikov's directive to his men, "Time is blood." Stalin and his generals were more than willing to exchange lives in an urban fight in order to gain time to reorganize, rebuild, and prepare for a counter-attack. Because the Russians had more men to sacrifice and could continue to reinforce Stalingrad, they knew they had the advantage in a battle of attrition and were more than happy to accommodate German attrition-based tactics.

b. Functional Time

The differences in functional time between the urban and non-urban phases of the campaign were stark. Advances on the open steppes were measured by kilometers and hours, in contrast to the city where progress was measured by meters and days. During the drive across the steppes, German forces fought relatively short battles and often went days without any contact. Clearing a hill or a balka typically took half a

day to accomplish, and after a brief and anticipated Soviet counter-attack the German forces would have time to rest and refit before another 2-3 days of movement. Air and artillery units responded more quickly to calls for assistance since it was easier to identify the foe and adjust fires. Perhaps the most important aspect of functional time in open terrain was the lack of a requirement to strictly coordinate and control activities with adjacent units. Aside from commanders' intent, the 14th and 24th PDs rarely ever had to pause for coordination on the steppe, even though they mutually supported each other during the entire advance. Commanders had relative freedom to move when and where they saw fit. Dispersal and the long-range nature of the engagements made functional time hardly an issue at all.

Functional time took on an altogether different meaning inside Stalingrad. As expected, everything in the city took longer. Fire support from artillery and aircraft was less responsive because of coordination difficulty and poor commander situational awareness. Maneuver units bogged down in the broken terrain, and numerous obstacles and the close proximity of the fighting slowed the battle immensely as individual soldiers naturally felt a reluctance to move under fire emanating from only 50 meters away. On the 30th of September, Lieutenant Stempel's journal reveals his views about the pace of the battle:

It is unbelievable, how the course of events here is developing into a war of positions! The fight rages for each house, each factory hall, for railroad cuts, walls and each cellar. And what we all fear seems to come true – that we'll be fighting here in winter. (Stempel, 2002, p. 45)

Miscalculations in functional time combined with the compression of operating spaces and frontages created horrendous coordination problems for the Germans fighting inside the city; these problems were manifested in delays, fratricide, and inability to orchestrate mass fires onto enemy positions, while the Russians were glad to take the time generated by these coordination problems to reinforce and shift assets around the battlefield to counter German intentions. German synchronization of operational planning appears to have been time-based, and when stiff Russian resistance disrupted the timetable, entire attack plans fell apart:

It was clear to the commander of Infanterie-Regiment 576 that the cleansing of Hall 6 (Manufacturing Hall) and Hall 4 (Assembly Hall) was going to be a bloody protracted affair. There was no possibility that the sector could be cleared before the suggested time of 0800 hours. A liaison officer of 24 Panzer Division equipped with a radio team, had been attached to Infanterie Regiment 576 since 0630 hours and provided reports about the course of the attack. He informed Oberst von Below that the complete capture of the Gun Factory had not succeeded. As a consequence, the assault of the 24 Panzer Division was now also postponed. (Mark, 2002, p. 296)

Functional timelines, and the dense compression of units, generated coordination problems, which led to longer duration of operations. On 21 October, the 24th PD headquarters published guidance demanding subordinate units pay particular attention to coordination issues in the following categories: Infantry, panzer grenadier and panzer coordination, artillery coordination, engineer and panzer coordination, adjacent unit coordination, coordination with the Luftwaffe, and general overall communications improvement (Mark, 2002, p. 305). These issues indicate a general frustration with delays in time and effectiveness compounded by the close proximity of so many assets.

c. Objective Time

Due to lack of sophisticated night fighting capabilities, the armies developed rhythms based on the amount of light available. In both the open and urban environments, the Germans used the hours of darkness predominantly to defend the day's gains, rest, and resupply. German air superiority and technical and tactical advantages were best suited for daytime conditions. Conversely, the Russians used the day to defend, dig in, and disrupt German operations. At night, the Russian air and artillery assets were used to continuously harass and interdict German rhythms, and although Russian efforts did not destroy much in the way of personnel or equipment, they did prevent the Germans from resting. Over time, this constant pressure may have led to increased fatigue and errors in judgment on the part of individual German soldiers. The Russians also used the night to launch raids and ambushes against German resupply efforts, and surrounded Russian elements were able to successfully escape under cover of darkness. Additionally, inability to constantly pressure the Russians allowed them to reinforce and resupply at night, and while no sources indicate this, it seems very likely

that a majority of the Volga river traffic flowed at night. Stempel's memoirs accurately describe the disconnect in rhythms, and how the Soviets were able to take advantage of German unwillingness to operate at night:

When it slowly gets dark, and the view is too unclear to make out anything, we stop the attack and take up positions, in order to be safe from nightly surprises and be able to spot every enemy approach in time. Runners to the platoons, platoon commanders to the infantry! Recovering killed, wounded to be prepared for transport. Make an evening report with sketches and off to battalion with it. Here none has any rest, every-thing is wide-awake, and ready for anything! And over all hangs the question, what will tomorrow bring? Throughout the entire night "the devil is let loose" with us! Just now our food carriers have been taken out by the Russians behind us – to our rear! The Russians rise out of the tunnels, which lead behind our front line and then in the dark wait for runners, ammunition and food carriers, overwhelm them and kill them. (Stempel, 2002, p. 75)

German disadvantages in relative, functional, and objective time greatly increased the difficulties they experienced in not only achieving their objectives, but in comprehending their environment because they put artificial time constraints on themselves, which succeeded in adding pressure but not thoughtful analysis. The difference in respect to the time dimension between urban and non-urban environments was profound.

3. Information

The ability to gain intelligence and turn that information into physical action defines the two processes most impacted by the nature of the urban terrain. The Germans' ability to sense and communicate served them well on the steppe, but was severely degraded by the complex, dynamic, and hostile environment of the city. German records and historical accounts of the battle mention little about intelligence or coordination problems, so much has to be inferred from their actions.

On the steppe there were few places to hide and very few hindrances to FM radio communications. German aerial reconnaissance and ground scout assets had little difficulty in spotting Russian formations as well as determining their strength and disposition. Similarly, command and control on the steppe was never a major issue. Even when radio contact was lost, commanders could physically see most of their units;

likewise, air and artillery coordination was much simpler. Due to the scarcity of civilians, there was little ability or need for human intelligence (HUMINT) networks. This greatly simplified intelligence matters for the Germans who could focus more on the technical means of intelligence collection. Another significant advantage the steppes offered the Germans was a manageable level of information to process. Commanders could get away from their staffs, and staffs could easily pace themselves given the low volume and highly accurate reports. At the same time, the steppes allowed for greater relative distances to the enemy, creating a larger time-space factor, which allows units greater planning, information processing, and reaction time.

The environment within Stalingrad created and presented a completely different effect on the information dimension. German ability to sense and communicate greatly diminished in the urban setting. The enemy was seen only in snap shots and would then disappear into a building or across a street. True enemy strengths most likely could not be accurately gleaned because of the inability to see the battlefield. Communications were also degraded by the irregularities in the environment. While we could not find anything in German records to confirm EMS interference, we believe, based on present-day understanding, that German FM radio communications were reduced due to physical interferences in the EMS caused by irregularities in the urban terrain. The Germans did complain about the unreliability of radio communications, but it is unclear whether the problems were environmental or technical. Wire communications, while slightly more reliable and secure, were also somewhat problematic due to their vulnerabilities to explosives, sabotage, and the broken nature of the terrain.

An army of 250,000 soldiers, fighting compressed in a city the size of Stalingrad, must have generated an incredible volume of intelligence and operational reports. We do not have any data to support this, but our own personal experiences in much smaller operations give us reason to believe that the volume of information produced at Stalingrad was likely very difficult to manage. A staff's ability to receive and comprehend all the critical information, while intermixed with other standard reports, continuously, for months on end, does not seem possible. This tremendous volume of information, while not documented, may have overwhelmed staffs that then became forced to prioritize reports. For instance, the train station in the southern portion of the

city changed hands fifteen times. The number of reports generated by attempts to seize this one installation alone were significant, and when you compound other reports coming in from adjacent and supporting units it becomes clear that information processing was anything but easy. Some of the 24th PD's observations on controlling the volume of information are indicated by general guidance to reduce radio traffic and improve brevity of communications (Mark, 2002, p. 331). Further complicating the Germans' ability to manage information was the extremely high death rate in commanders and staff officers. From the beginning of September through the end of October in the 24th PD, the division commander, all regimental, and most of the battalion commanders were either killed or wounded (Mark, 2002, p. 331). Those commanders that managed to survive became prisoners within their own command posts because this was the only place from which they could capture the events going on across the battlefield. The paradox of the situation is that commanders sitting in command posts tend to demand more and more information about the situation instead of going out to see the situation for themselves. This increased demand for information not only increases the volume of information to be managed, but places added reporting burdens on subordinate leaders preoccupied with trying to fight in an urban environment. Prior to becoming a company commander, Lieutenant Stempel served as the adjutant in the 108th PG regiment of the 14th PD. On 17 October, during the height of the factory fights, he made the following observation, "In these days the brigade commander only rarely leaves the command post. He is in the "situation room" continuously and follows incoming messages and the way the situation is developing" (Stempel, 2002, p. 60).

German accounts do not address the use of HUMINT during any portion of the campaign. However, based on our understanding of combat operations we hypothesize the following in regard to HUMINT: Loose rules of engagement and a disregard for civilians probably guaranteed poor HUMINT throughout the battle. HUMINT appears to have been most needed for monitoring Russian nighttime activities, but as the battle progressed, Russian prisoners became rare and less reliable. The lack of HUMINT probably forced the Germans to rely more on intrinsic technical means. This imbalance in collection assets can often lead to disconnects between what the report indicates and actualities on the ground. Granted, the Germans were probably never going to develop

an intricate HUMINT network because of time considerations and the fact that most Russians despised the Germans, but if they had tried, they may have been able to persuade some of the local populace to collaborate, as they had during their advance to the city. The disconnect between the processing of information and the reality of the situation is the biggest indicator of a breakdown of the information system and its effectiveness. Again, Stempel observed:

Yes, today I witness this “clean-up” “on the map” at the divisional command post – about **60** kilometers south of Stalingrad. A Russian penetration of the Rumanians must be cleaned up. By an attack of German tanks and panzer grenadiers. The situation is corrected very quickly. And without any severe losses! Yes, that all sounds so simple, so sober, so according to schedule and routine. And yet I know exactly how it looks “down there” with the squads, platoons and companies. When the names of places, units, times and losses get here as “reports.” (Stempel, 2002, p. 60)

The breakdown of the German information system at Stalingrad affected the highest levels of the German command. This breakdown of accurate, intelligible information in a hostile dynamic environment likely contributed to a desire in the leadership to centralize control and decision-making. Hitler’s concern about the situation and distrust of his commanders led him to interfere with ongoing operations to the point where he made several tactical level decisions from over a thousand miles away (Mellinthin, 1968, p. 197). The myopic view of Stalingrad taken by Hitler and his commanders may have, in turn, contributed to their inability to detect or acknowledge the Russian preparations for Operation Uranus. The ability to sense and communicate that started out as a chief strength of the German army became one of its principal weaknesses at Stalingrad.

4. Use of Technology

German technical systems and organization in the summer of 1942 were near perfect fits with the environment in the move on Stalingrad. Panzer formations mixed with mechanized infantry and self-propelled artillery and anti-tank units found the steppe to be an ideal environment in which to operate. On the steppe, the Germans made maximum use of every technical and organizational advantage they possessed, from

mobility, to communications, to air coordination, to optics. Historical accounts of the advance do not demonstrate any record of innovation or adaptation of equipment or organization because there likely was not much of a need to do so.

In the urban environment, German technological advantages were not merely lessened, but in some cases they became detrimental to German efforts. The experiences of tactics and weapons used in city fighting were consolidated by the 24th PD near the end of the October fights for the factories. A verbatim summary of the key problems and lessons learned that the division recorded is described below.

a. General

- Groupings of tanks, armored infantry, SP anti-tank guns, engineers, and artillery have proved excellent in city fighting.
- Sufficient allocation of engineers is required from the outset.
- The most dangerous enemy weapons are anti-tank rifles and snipers.
- The most valuable asset are the men, therefore, mobile assault forces should be conserved.

b. Panzer Grenadiers

- Infantry squads must be outfitted with sub-machine guns, grenades, explosive charges, smoke equipment and multiple radios.
- Explosives are required for clearing mines and tank obstacles.
- Each platoon should have a squad of flamethrowers, and companies should have mortars with lots of ammunition.
- Only attack through open areas under cover of artificial fog.
- Against bunkers smoke is more effective than hand grenades.
- Direct support of assault groups by artillery is only possible by attachment of individual guns.

c. Panzers

- Terrain difficulties are so extreme that, in principle, panzer operations should be avoided in a city. The main weapon of the panzer, movement, cannot be used properly.⁹ Panzers present large targets and see little.
- The panzer is not suited for city fighting in units such as a Panzer Regiment.
- Panzer to infantry coordination is a major issue.

⁹ The ability to maneuver and mass fires on specific targets was the true strength of the lighter German tanks. They were not designed to engage in close quarters tank battles against the superior armor of Soviet tanks.

- Operations by single tanks is refused because of the lack of cover fire.
- Panzers must not fight in front of the infantry. They must be kept back to provide covering fire. Infantry must not crouch behind tanks because tanks draw lots of fire. Infantry need to be out front clearing mines and spotting targets for the tanks.
- Operations of panzers without grenadiers is only expected to succeed against a very demoralized enemy without any anti-tank assets.
- Panzers do not have double armor. They must not be used as assault guns!

d. Artillery

- The material and moral effect of massed fires is severe according to reports from prisoners.
- Artillery liaison officers near the infantry have proven themselves.
- Because radios do not work reliably, liaison officers must also be connected by wire.
- Artillery spotters work best in high buildings behind the front line trace of troops.
- Because of echoing, all sound ranging systems must be removed.

e. Engineers

- Engineers must be briefed ahead of time what their mission will be, so that they may bring the necessary equipment and nothing more.
- Engineers must be given proper fire support, and must be employed in elements no smaller than platoons. Squad assignments are refused.
- Engineers are valuable, difficult to replace specialist troops. Their infantry operations are allowed only in an emergency.

f. Luftwaffe

- Employment of bombers in front of attack spearheads has proven ineffective because the front line changes so frequently.
- Russians move in close to our positions when they detect our aircraft. Therefore, our assets should be used in the enemy rear areas. (Mark, 2002, pp. 325-331)

None of the German equipment of 1942 was designed specifically for urban warfare, so Stalingrad became a test bed for innovation and technical improvement.¹⁰ The Germans learned that many of their weapons had little effect in penetrating buildings made from reinforced concrete. The need for delayed fuses became paramount, as did shape charges for getting at the enemy. In a similar fashion, the

¹⁰ From our research it appears that no military possessed city-specific weapons prior to 1943.

Germans learned how to use over-pressure and the limited oxygen inside buildings and cellars against the defender. They developed new rocket systems called Do-Werfers. Instead of producing shrapnel, these rockets generated shockwaves that, “tore lungs to pieces and caused huge casualties amongst the Russians. The dead were practically untouched on the outside and only a small stream of blood came out of the mouth” (Mark, 2002, p. 277).

The Germans learned quickly from the Russians about the value of snipers in a city fight, and quickly organized their own snipers at all levels to first counter Soviet snipers, and then to interdict Russian operations. Mortars also became more important in the city, as the high trajectory fires made them the primary close support weapons. Additionally, the Germans developed the use of small caliber flak weapons and self-propelled artillery into direct fire roles. The volume of fire these weapons provided became essential for the type of penetrating covering fire needed to support an assault in the city. The Germans became very creative in using smoke delivered by any number of means to obscure movement or deprive oxygen in closed in areas, as well as the use of captured Russian trench periscopes to safely view the battlefield out of sight of snipers. Finally, German infantry found that flame weapons proved effective in rooting out the enemy from enclosed positions and buildings.

5. Human Factors

a. Limits of the Human System

The drive to Stalingrad was by no means physically easy on the German soldiers involved. The heat, dust, and stress of combat clearly took its toll physically. The speed and duration of the Germans’ advance alone indicate that there was little time allocated for rest. However, the battles during the advance were characterized by long-distance engagements that were vehicle-based and broken up by intermittent periods of non-combat activity. Sensory overload on the steppe, if it did happen, was rare, only in that German records make no mention of combat fatigue or non-battle injuries (Mark, 2002; Stempel, 2002). Additionally, on the steppes there was always room and time to escape fighting whenever it threatened to become overwhelming. Stalingrad offered no such luxuries.

The physical conditions inside the urban environment were taxing enough. Soldiers complained about the endless sprinting and bounding on concrete and iron. The incessant dragging of dead, wounded, and equipment in a “rubbled” city wore troops down. Unlike the steppe, the city offered no respite from this physically grueling experience:

Yes, you surely cannot imagine the last phase of this wrestling! No! No one can! From three sides we receive continuous fire from snipers. Three weeks of man-to-man fighting without a break, house-to-house fighting, man-to-man fighting! There is no way one can sleep! The Russians are about 30 meters away. Washing, shaving, all of this is done away with. I already have a respectable beard. We have lice and are in tatters! Today the Bolsheviks again laid such a drumfire barrage of 40 minutes on our positions and we only could fold our hands and say “Amen”! If I will ever get back to brigade I do not know. So now I close for today. I am not capable of reporting more. All the best and Sieg Heil! (Stempel, 2002, p. 85)

The amount of over-pressure experienced by soldiers operating in the confined and covered spaces of a city also greatly impacts the physical system, adding to its overload. Lieutenant Holl of the 276th Infantry Regiment, fighting alongside the 24th PD, reported:

A shock wave on the left half of my face made me dizzy for a second. The ‘stove pipes’ of the salvo were striking everywhere around the edge of the room. The splinters as well as a large part of the air pressure developed by the explosions were blown about. A part of this mighty pressure, however, came down upon me. My head buzzed and I felt as if I’d been hammered. As my comrades looked at me, I saw their lips move but I couldn’t understand them. It felt like a steam valve letting off steam without interruption. (Mark, 2002, p. 291)

Continuous exposure to close proximity, high-level violence, sensory overload, and an inability to escape took tremendous tolls on the soldiers involved. Also, the lack of replacements or fresh troops prevented the Germans from rotating their forces out of that environment, whereas the Russians were able to bring in fresh forces over time, though presumably they lacked a rotation system as well. After a short time, both veterans of two to three years of campaigning and young raw recruits became inept and unable to perform any but the simplest of tasks. The psychological and physiological degradation of the German front line troops appear to have been linked. Records of battle

stress and fatigue do not exist, partly because the Germans officially denied the existence of such phenomena. They declared that to invent such a term was to invite the excuse (Beevor, 1998, p. 151). However, after two months of fighting in the city, numerous soldiers began to die without detectable symptoms. Autopsies indicated that these soldiers died from shrinkage of the heart and an over-enlargement of the right ventricle. It is possible that these symptoms were the result of the cumulative stresses caused by the continuous, close proximity nature of urban combat (Lewis, 2000, p. 20).

b. Will and Morale

Clausewitz's notion that the need for military virtue is greater the more the environment tends to complicate war and decentralize forces is readily apparent in the comparison of the advance to Stalingrad and the urban phase of the campaign. While measuring will and morale from a historical perspective is difficult if not impossible to achieve, letters home and reports to headquarters offer some insight into mindsets, and lend themselves to qualifying the "unseen forces that cannot be measured but only felt."

The following is a compilation of reports and letters, abbreviated to highlight the mood and morale of forces involved in the campaign. In the divisional records, very little is mentioned about will and morale during the move to Stalingrad, other than the sense that spirits within the ranks and confidence were high. The following comes from entries in Lieutenant Stempel's diary and the records of the 24th PD:

16 August – It was Sunday and it was decided that we have a dance. (Report from a Battalion commander getting ready to describe the day's attack). (Mark, 2002, p. 12)

20 August – We leave the giant dust clouds that tower over the entire wide-open land and darken the skies behind us. Now we are coming, now it is our turn! (Stempel, 2002, p. 11)-The Kalmuck steppe, this never-ending, enormous grey-beige-brown expanse, was transformed overnight into a light-violet sea. Millions of meadow saffron converted the autumnal beauty of the landscape into a vivid picture. (Mark, 2002, p. 23)

22 August – And the tanks that now are standing on the high bank at Rynok are cutting this vein of traffic, the connection between the Caspian Sea and the north, with their fire. A proud feeling comes over all of us.

Now it's our turn, we'll take the town from the south and when we stand at the Volga, we'll be standing before the very gates of Asia. (Mark, 2002, p. 23)

26 August – Added to that the wind without interruption that blows away everything and covers it in a ghostly white-grey. No, the days and weeks in Stalino are weeks and weeks past. It is stunning to see, how quickly people are capable of adapting. But it won't last long here – our advance and our attacks are unstoppable. (Stempel, 2002, p. 19)

Not long after the urban fighting began, there appear marked differences in the journal entries and reports:

5 September: It is unbelievable to see with which bitterness and desperate courage the Soviet soldiers defend this point, which is so important to them. But we do not let up and despite high losses the attack is carried forward without pause. We're not to give the Bolsheviks a break in the fighting; we're to keep pressure mounted on them. Of course, more and more clearly the question is asked: "How are we to carry on like this in the days and weeks to come?" The muster rolls of the companies have been decimated and there is no mention of replacements. From where should these come, anyway? (Stempel, 2002, p. 21)

18 October: I was already awake early. Sleep was restless. The responsibility and uncertainty about success and failure made me somewhat nervous. I had to go through the waiting period. In such hours time seems to stand still... (description of battle)...We worked our way forward with mutual fire support and engaged nest after nest. That also added to our casualties...The enemy defended himself to the last, none of them giving themselves up. (Mark, 2002, p. 289)

19 October: In the early morning as everyone left the bunker, a direct hit smashed into it and buried one man under the rubble. Someone dug him out with a smoke-blackened face and his body torn into pieces. As Sunday approached with cold rain showers, the second one was hit: a shell exploded directly behind him and tore away the back of his head. When one saw young comrades lying there, then totally different thoughts arise that cannot simply be put down in writing. (Mark, 2002, p. 292)

Fear generated by uncertainty and lack of confidence also degraded German discipline. An anonymous soldier recounts his own experience with fear, "If only you could understand what terror is. At the slightest rustle, I pull the trigger and fire off tracer bullets in bursts from the machine gun" (as cited by Beevor, 1998, p. 150).

Fatigue, fear, frustration, and defeat, all magnified by the urban setting, worked in unison to lower the will and morale of a once proud 6th Army. At the same time, Russian will and morale manifested in ferocious resistance continued to improve. Lieutenant Holl reported on the fanatical efforts given forth by individual and isolated Russian soldiers:

Located in front of us was a dug-out, apparently a command position. We worked our way up to it. Hand grenades were thrown. Willmann received a couple of splinters, nevertheless, he could go to the first aid post by himself.

Juschko called: "Herr Letinant, there's an officer!"

"Call to him that he should give himself up!"

With the shout from Pawellek, the officer took cover and opened fire on us with his submachine gun. We returned fire. Dittner to the left of us, had recognized the situation. With a leap, he was within 10 meters of the Russian. With this move the Russian recognized his hopelessness and took out his Nagan pistol and shot himself. We continued on. (Mark, 2002, p. 291)

The mere fact that anyone could have held up in such horrible conditions is testimony to the morale and courage of the men on each side, and when units became isolated the only thing they had to fall back on was their will to fight. However, months of frustrating urban combat culminating with encirclement and entrapment eroded the 6th Army's will and morale leading to losses in confidence, and the belief that they would not succeed.

c. Ethics and Morality

Historian S. J. Lewis has observed that perhaps the closest that war ever came to reaching Clausewitz's absolute during the battle of Stalingrad. The fighting within the city demonstrated the increased lethality of modern weaponry, and a diminution of command and control, where young NCOs or even privates found themselves in positions to make decisions (Lewis, 2000, p. 2). The increased lethality combined with diminished control, long duration, complexity, and proximity caused ethical and moral decisions to have to be made by young, inexperienced men, who were tired, terrified, angry, and equipped to do a lot of damage.

It was difficult to discover cases of immoral behavior for the obvious reason that perpetrators were unlikely to write about their crimes, and victims were unlikely to survive. German records from the drive to Stalingrad indicate that Germans had no problems processing Russian POWs. In fact, the records indicate that the Russians surrendered by the tens of thousands, but POW rates dropped off sharply to almost nil once the street battle began. When the battle turned into a ‘kill or be killed struggle’, it is easy to imagine that over time leaderless individuals would begin to feel that there was nothing wrong with violating established rules of war and accept that behavior as normal. Without doubt, the stress, fatigue, and fear experienced by both the Germans and Russians had to make them vulnerable to engaging in immoral behavior.

Lieutenant Stempel’s diary contains an interesting comparison of ethical behavior between the Western and Eastern fronts:

The Armed Forces Supreme Command feels itself to be forced to order the following:

From October 8th at 12 o’clock in the afternoon all British officers and men captured at Dieppe will be bound up. This measure will last until the British War Ministry states that in the future it will give truthful accounts of the shackling of German prisoners, or it has gotten the authority to enforce its orders with the troops.

In future all terror and sabotage troops of the British and their auxiliary troops who do not behave themselves as soldiers, but as bandits, wherever they operate, are to be killed mercilessly in combat by German troops.

Well, problems like that we do not have here. We know exactly what the Bolsheviks do with our comrades who have fallen into their hands. We have lived through it when we’ve found them. Slaughtered, treated bestially and tortured. No, reprisals would not have any effect here. Here there are no “laws.” (Stempel, 2002, p. 48)

Clearly, the morality and ethics of the Western and Eastern fronts were different from the outset of the war, but during 1941 and the summer of 1942, the 14th and 24th PDs took tens of thousands of prisoners and took time to safeguard prisoners as

directed by higher command. Many of the atrocities that took place against the prisoners occurred as they were passed off to the SS in the rear. In contrast, at Stalingrad prisoners taken by either side were an exception.

After a month of fighting in the city, German discipline also showed signs of breaking. Non-combatant refugees were killed and looted in a “degrading” manner, NCOs began to threaten officers, and still others simply refused to fight or even deserted (Mark, 2002, p. 262-263).

6. Decision Making

The innovative German doctrine of mobile warfare served the Germans well during the early years of the war and especially during the advance to Stalingrad, and German commanders seemed to be confident in their abilities to outfight the Russians. Additionally, during the advance, the balance between political will and military necessity were in harmony. But all this changed the moment the lead units entered into the urban arena.

The evidence that German mobile warfare worked well on the steppes is conclusive. As previously mentioned, German training, equipment, organization, and experience were all geared to fighting fast, well coordinated, and violent battles in open terrain. The German’s combined arms approach to mobile warfare served them well against the Russians, whose lack of effective mobile warfare doctrine prior to 1943 put them at a noticeable disadvantage on the steppe.

The city streets of Stalingrad completely offset all German doctrinal advantages. In fact, the Germans had no doctrine for urban warfare which contributed to the tremendous costs of the battle. General von Lenski, commander of the 24th PD at Stalingrad, made the following observations about urban doctrinal shortcomings in a report to his higher headquarters on 21 October:

While the division had only small total casualties in panzers during the past fighting, they climbed in this period up to fifty percent. These developed from the fact that we repeatedly had to supply a few panzers to the infantry, employed in stormtroop operations in place of the absent assault guns. My objection, that this type of use of panzers contradicted the regulations and every experience, and that improper missions by the regiment and battalion commanders of the infantry had only seldom led to

the desired result, was also acknowledged by LI Armeekorps. It remained with this unintelligible practice, however, leading to completely useless casualties. It is important for the future that experiences in city fighting in Stalingrad be interpreted to close an undoubted hole existing in our training. (Mark, 2002, p. 304)

German officers attempted to innovate during the course of the urban fight, but major doctrinal changes are nearly impossible to implement during the course of an operation, due to lack of time and ability to educate, train, and equip forces for new ways of fighting.

The lack of feel for urban combat most likely carried with it the consequence of increased centralization of authority and control. German commanders unfamiliar with urban combat, unable to receive an accurate picture of the situation, and under pressure from higher commanders going through a similar experience, probably felt a need to exert more authority and control over a situation that called for decentralization of authority and ad hoc operations (Mellinthin, 1968, p. 197). As previously noted, Hitler made tactical decisions from over a thousand miles away, and even Paulus' headquarters was far outside the city. A primary role for those at the top of any organization is to look outwards at the environment and understand and manipulate it in order to enable the organization to operate more effectively within it. The pull to look inwards, to how those within the organization operated, took the German commanders away from their principal function. Junior officers and NCOs are primarily responsible for small unit affairs. When field grade and general officers become involved at the small unit level, they are less able to see the bigger picture, and the potential for external dangers becomes greater.

Harmony between political will and military necessity is paramount to waging a war designed to establish peace on one's own terms. Throughout the course of a war, campaign, or operation the harmony between the two can change. The inability, associated with urban warfare, to accurately predict costs in terms of time, resources, and lives tends to disrupt that harmony more so than do other environments.

Prior to deciding that the main effort on the eastern front be directed towards the Caucasus, Hitler and his senior commanders debated what the summer's objectives should be. Hitler coveted the oil there and wanted to cut the Soviets off from it. Some

commanders wanted to go after Moscow because of its symbolic value, some commanders advocated a general withdrawal to more defensible lines, and yet other commanders wanted to orient solely on the destruction of the main elements of the Red Army, wherever these were (Liddell Hart, 1948, pp. 194-198). During the advance across the Ukraine, both Hitler and his generals appeared somewhat satisfied with the political/military accord they had reached. Hitler was driving towards his goal, and the Wehrmacht was succeeding in destroying large formations of Soviet combat power.

Fuhrer Directive 45 altered this balance, and many generals, to include Paulus, feared the danger to the 6th Army's flanks; they did not understand the need to seize Stalingrad (Goerlitz, 1963, pp. 59-61). As the battle within Stalingrad commenced, Hitler became obsessed with its capture even though Paulus, on four occasions, reported that fighting for the city was rapidly eroding his combat power (Lewis, 2000, p. 20). Hitler's public response to the pleas of his generals asking for a shift in strategy away from Stalingrad was, "You can be certain no one will get us away from there" (Beevor, 1998, pp. 439-440). Even more amazing, a few days later Hitler admitted privately that Stalingrad was no longer of any decisive operational importance, but rather vital for public and world opinion and that somehow the capture of the city would bolster German morale (Lewis, 2000, p. 21). In the end, a city bearing the name of Hitler's sworn enemy and of little immediate military value (Beevor, 1998, p. 70) became a matter of national or perhaps personal prestige. Had Hitler understood before the battle began that he could potentially lose 250,000 men taking the city, he most likely would have directed a different course of action. But when the 6th Army became decisively engaged in the fighting, political will overruled military necessity and that imbalance led to a host of poor decisions. Hitler's obsession with the political significance of Stalingrad caused him to create symbolic meaning to the battle, and even though he was aware of the damage being done to his forces, he could not withdraw; to do so would be equivalent to an admission of defeat. Cities may carry with them symbolism that may weigh into decision-maker objectives. This symbolism, as exemplified at Stalingrad, trumped military judgment.

Rules of engagement at Stalingrad were very liberal and did not significantly constrain the fighting forces, either in terms of weapon systems to be used or considerations about collateral damage. This almost complete disregard for ROE related to the enemy probably contributed to bolstering the Soviet's will to resist. Proper treatment of civilians and POWs aided the Germans in their advance to the city, but when those policies were neglected beginning with the Luftwaffe fire bombings, the Germans made the struggle a life or death matter for all involved.

E. CONCLUSION

In many ways, Stalingrad was the first modern urban fight of its kind and scale, and because of this the differences in effects between a unit going from non-urban to urban are prominent. Table 1 highlights the qualitative differences in the 5 factors between the two environments.

Table 1. Effects of the Factors on Operational Performance of 14th and 24th PDs.
Scale: Bad Effect (---) to Good Effect (+++).

Environment	Time	Information	Technology	Human Factors	Decision-making
Urban	(-)	(--)	(--)	(-)	(---)
Non-urban	(+)	(+++)	(+++)	(++)	(+++)

One could say that time never was on the German's side, either during the advance to Stalingrad or in the city proper. In terms of relative time, the Soviets had advantages in both environments, but the city increased this advantage in relative time because it stalled the German advance causing the Germans to lose the initiative. German advantages in functional and objective times on the steppe turned into disadvantages in the city. This drop off accounts for the overall negative effect for time in the transition between environments.

German ability to sense and collect information on the steppe was excellent. The superb situational awareness created by the open terrain played to German doctrinal advantages in command and coordination. However, in the city these advantages were quickly lost, and one of the strengths of German operations quickly became a problem.

German technical systems and organizations were designed for mobile fighting on relatively open terrain. The relatively light armor and small caliber weaponry on German tanks was conducive to the German penchant to maneuver into positions of advantage. German air-ground tactics were also designed for open terrain. Stalingrad mitigated these advantages and turned some of them, like mass panzer formations and air-to-ground coordination, into actual liabilities.

Human factors are impossible to quantify due to a complete lack of data from either environment, and are thus inconclusive for this case. However, the qualitative comparison of journal entries, records, and letters home seems to indicate that the Germans inside Stalingrad were reaching the limits of their ability to endure the fighting therein. Sensory overload, lack of rest, fear, and uncertainty all seemed to take their toll on an army that, just a few months before, experienced victory after victory.

German decision-making was most degraded by the change to the urban environment. German doctrine encouraged low-level initiative and sought to maintain initiative and tempo advantages through the empowerment of junior leaders. This system worked well on the steppes, but in Stalingrad uncertainty was king. Uncertainty added to extremely high losses in experienced junior leadership, pulled the higher echelons of the chain of command—to include Hitler himself—to exert more authority over units unaccustomed to this type of intervention. Leaders who make decisions in areas where they cannot feel the effects of the environment or see the reality on the ground are prone to make uninformed decisions to some degree.



Figure 8. Russian Infantry at Stalingrad (From: Dunnigan, 1978, Plate).

The inability to shift capabilities from one environment to the extreme of another is indicative of German failure to understand how our five factors of urban combat impact forces and leadership at all levels of war. We acknowledge, again, that failure to understand these impacts was not the principal cause of the German calamity; the Russian counter-offensives, Russian ability to keep reinforcing Stalingrad from the east bank of the Volga, and Hitler's unwillingness to allow the 6th Army to break free were the major contributors to the German defeat. However, German unpreparedness and inexperience for city fighting allowed the Russians the time and opportunity to hang on long enough to spring their trap.

III. ISRAELI OFFENSIVE OPERATIONS IN THE SINAI OCTOBER 1973

A. BACKGROUND

In June 1967, the Israelis launched a devastating attack against their Arab neighbors of Egypt, Syria, and Jordan. In six days, the outnumbered Israelis seized limited objectives from all three nations while also humiliating them militarily by destroying 80% of their combined military capability. In seizing the Gaza Strip, Golan Heights, the West Bank, and the entire Sinai Peninsula east of the Suez Canal, Israel doubled its size (Gawrych, 1996, p. 3). With Israel now a regional power, the Arab nations would rebuild their militaries for over six years before they would be able to challenge the dominant Israeli triad of intelligence, airpower, and armored maneuver forces (Gawrych, 1996, p. 5). By October 1973, the Egyptians and Syrians were prepared to launch a surprise attack to inflict severe casualties and regain their lost territories. The combined Arab forces launched this long anticipated attack on the Jewish Day of Atonement, Yom Kippur, 6 October 1973.

The combined Egyptian and Syrian offensives of the Yom Kippur War caught the Israelis completely by surprise. The Israelis took heavy casualties on both the Sinai and Golan fronts from the opening of fighting on 6 October 1973 until the combined offensive stalled on 10 October 1973. From this point, the Israelis began to reorganize their forces and take the fight to the enemy in an effort to decimate their opponents. This came in the form of the Israeli counteroffensive, the Suez Canal crossing, and the subsequent encirclement of the Egyptian 3rd Army.

For the purposes of this study, comparing Israeli offensive operations during the Suez Canal crossing and breakthrough to the later attack on Suez City offers a comparison of how this very competent military force operated in successive operations, one a maneuver-style operation and the other urban combat operation. While the fighting on the Sinai front did not lead to a clear victor in the conflict, comparing the non-urban operations of the canal crossing and breakout to the assaults on Suez City demonstrates the challenges a proficient military faces when it shifts operational environments.

B. THE ISRAELIS TAKE THE OFFENSIVE

Badly battered but not beaten, the Israelis looked to regain lost territory and inflict heavy casualties on their enemies. The Syrian front had collapsed and allowed Defense Minister Dayan to begin shifting strategic reserves and attack aircraft to the Sinai front where the fighting was fierce, with heavy casualties on both sides. Israeli doctrine called for attacking an opponent in his territory to annihilate his forces and terminate the war on Israel's terms (Adan, 1980, p. 245). This would require regaining the offensive and pushing into enemy sovereign territory to deal the decisive blows.

Since the 1967 War, Israel understood the possibility of needing to attack into the enemy territories of Egypt, Jordan, and Syria. Two significant linear obstacles would prevent these potential attacks: the Suez Canal and the Jordan River. Capabilities for bridging both these natural obstacles were needed in order to maintain the offensive. Assault bridging equipment was critical to ensure the use of combined arms to support the expanse of a bridgehead. It was understood that elite Israeli infantry could seize the bridgehead easily; but without armor support to exploit the bridgehead, the offensive would not succeed.

During the winter of 1971-72, Major General Adan's division was charged with conducting an exercise trial to prove the operational assault bridge concept could be part of the Israeli offensive doctrine (Adan, 1980, p. 247). Exercise results demonstrated the clear need for this capability, but also highlighted the complexity involved. It was understood that the assets required to conduct a successful bridging operation might exceed the costs the Israelis were willing to expend, both in equipment and lives (Adan, 1980, p. 249).

During the stalemate of 10-13 October, the Israelis decided that a crossing of the canal was necessary in order to break the deadlock and attempt to seize the initiative. With the Israeli decision to push across the Suez Canal into Egypt, Adan was given the mission to lead the bridge assault. This was not going to be an easy task, as the Egyptians still had significant forces on the Israeli east bank of the canal and these forces were well prepared for the impending Israeli attack. Additionally, the fertile strip of land

that bordered the canal on the east and west was a deceptive “green belt” that contained numerous Arab infantry and armored units waiting to disrupt Israeli attacks on the east bank of the canal.

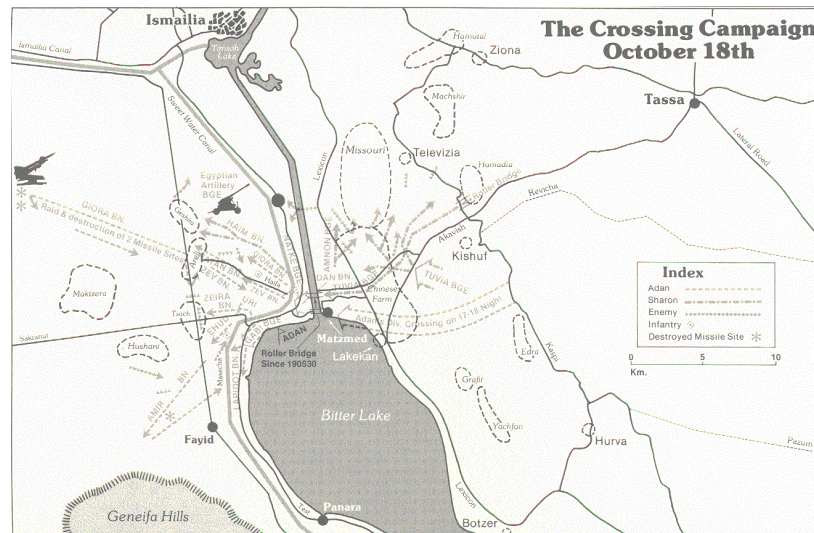


Figure 9. Israeli Crossing Campaign (From: Adan, 1980, p. 309).

Because of these conditions, the Israelis would need to choose a bridgehead site carefully, and patiently wait for the right time to launch the operation, construct the assault bridge, and exploit the crossing with adequate armor to penetrate into Egypt. The earliest the Israelis expected to be ready to assault the west bank was not before the 13th. U.S. reconnaissance photos showed a lack of forces north of the Great Bitter Lake on the west bank. Surprisingly, this very location was projected as a likely crossing by both the Egyptians and Israelis in pre-conflict war plans (O’Ballance, 1978, p. 242).

Regardless of the Israeli plan, the Egyptians still had significant forces on the east bank and were mounting an offensive of their own to break the standoff. At approximately 0600 hours on the 14th, the Egyptians attempted to break the stalemate and break through the Israeli lines that were now swelling with replacements from the Golan front. The Egyptians attacked nine objectives across the entire front instead of concentrating their combat power at one decisive point (Adan, 1980, p. 238). By noon on the 14th, all Egyptian offensive capabilities had been exhausted in one of the largest tank battles in history (Rogers, 1979, p. 31). This battle was the moment the Israelis were

looking for. With their enemy having suffered a significant loss of offensive power, the Israelis could then push to the canal and establish a bridgehead. Based on the actions of the 14th and the availability of the bridging equipment, the plan to cross was set for the evening of the 15th.

When the Egyptian attack on 14 October failed, we thought that they would not resume their offensive in the next few days. Therefore, if we wanted to end the stalemate and overcome the enemy, the only way was to attack. And that was the decision: to attack and to cross on the following day, the fifteenth of October. (Adan, 1980, p. 242)

C. THE ISRAELI PLAN

Based on information gathered from U.S. reconnaissance flights, the Israelis chose to seize and expand the bridgehead north of the Great Bitter Lake. This bridgehead would allow for rapid movement of forces onto the west bank where they could penetrate quickly in the open country. The staff estimates calculated approximately one night of fighting to secure the corridor up to the canal on the east bank. This would allow the bridge to be moved up quickly, free of enemy ambushes. The plan called for one rather than two crossing sites to move two divisions across the canal. This aim was to create a force sufficiently strong to expand the bridgehead and counter any Egyptian threats to the bridging efforts (Adan, 1980, p. 255). The second phase estimated advances north and south on the west bank of the canal to encircle as much of the 2nd Egyptian Army (defending north) and 3rd Egyptian Army (defending south) as possible. Within 24 hours it was anticipated that Israeli forces would be able to seize Suez City and control the southern portion of the canal entirely (Adan, 1980, p. 254). The Israelis also wanted to ensure an avenue of escape for the defending Egyptian 3rd Army in and around Suez City. The hope was that this would defuse enemy pockets of resistance as the Israelis moved to take the city (Adan, 1980, p. 257).

1. Israeli Crossing Execution

On the evening of the 14th, Adan's Division was assigned the task of clearing a corridor to the canal. Given the heavy fighting that day, the Israelis did not expect stiff resistance. However, the Egyptians had had several days since their initial gains of 6 October to solidify their positions. The green belt offered the defending Egyptian infantry and armor forces excellent cover and concealment as the terrain was broken with

numerous linear obstacles, such as cross-cutting farm roads and irrigation ditches. Additionally, the Egyptians were holding two key positions to the east of the green belt: Missouri Ridge and the Chinese Farm. The effort to reduce these strong points to support the crossing operation would cause the Israelis to waste valuable time and resources.

From the evening of the 14th, for approximately 48 hours, the Israelis would make several attempts to open the Akavish Road that would lead to the canal's edge. The Egyptians executed a well-prepared defense in depth that was effective to keep the Israelis from moving their bridging equipment forward. Adan's division did the majority of the fighting to clear the corridor. He augmented his predominantly armored and mechanized forces with Colonel Uzzi's Paratroop Brigade that was responsible for seizing the west bank bridgehead by rubber assault boats and "mopping up" pockets of Egyptian resistance that held up the progress to the east bank (Adan, 1980, p. 290). These operations can hardly be considered "mopping up," as the Israelis were often surrounded for hours by counterattacking Egyptians who attempted to hold every inch of the green belt. Adan was skillful in his rotation of the infantry to ensure they were well rested when not engaged in these combat operations (Adan, 1980, p. 296). When the bridge was finally established on the night of the 17th, Adan began to move his brigades to the west bank. By 0500 hours on the 18th, two of Adan's three brigades had finished crossing and were moving directly into combat to seize the high ground at the Geneifa Hills and seek out the Egyptian surface to air missile sites (SAMs) that would impede Israeli air cover for the offensive. The high cost of the green belt combat was about to pay dividends as the Israelis launched the "...breakthrough into Africa!" (Adan, 1980, p. 310).

Crossing the Suez Canal on assault bridge.



Figure 10. Adan's Division Crossing the Suez Canal (From: Adan, 1980, Plate).



Landscape of the green belt.



Tanks operating in the green belt south of the stone bridge.

Figure 11. Green Belt Terrain and Combat. Note the Dense Vegetation. (From: Adan, 1980).

2. The Breakout and Encirclement

From the 18th to the 22nd of October, Adan's and Magen's divisions moved rapidly across the open plains west of the green belt of the canal. The open expanses of terrain on the Aida plains were at first a relief as the armored forces could move quickly, with great visibility. But the plains also lacked identifiable terrain. This became an issue as vehicle dust clouds mixed with the featureless terrain to cause the Israelis to again move cautiously, this time out of fear of committing fratricide and due to navigational difficulties (Adan, 1980, p. 347).

Key to the Israeli plan to drive deep into Egyptian territory, encircle, and destroy the Egyptian 3rd Army was the systematic destruction of the numerous Egyptian SAMs defending the strategic reserves and routes to Cairo. With a slow Egyptian response to the Israeli offensive, Adan and Magen met mostly light and disorganized resistance. They eliminated this resistance using the same tactics employed in the green belt – armor assault followed by objective seizures by infantry. The pace of the operations was fast and confusing, as Israeli elements would jump from objective to objective quickly

cleaning out the isolated defenders. In accordance with this Israeli tactic to seize terrain and encircle the enemy, strong points were only reduced by follow-on forces when necessary.

Only after the Israeli breakout on the 20th did President Sadat consider the Israeli actions on the west bank to be a threat. He ordered more forces to the Sinai, but by then the fast-paced Israeli offensive could not be stopped militarily (O'Ballance, 1978, p. 246). On the 21st, Adan continued to have success with his southwestern sweep to encircle Egyptian forces. The slow Egyptian response was now sealing the fate of the 3rd Egyptian Army as Adan moved directly to Suez City and Magen's division moved to cut the Suez-Cairo highway. On the 22nd Minister Dayan ordered Adan to drive 20 km to the south to seize the southern tip of the Little Bitter Lake (O'Ballance, 1978, p. 249). Speed was critical as a ceasefire was planned for 1852 hours that evening. Even with scattered Egyptian strong points, Adan was still unable to get significant forces to the Little Bitter Lake by the time of the ceasefire.

On the 23rd, the Israelis broke the ceasefire and continued to encircle the 3rd Army. Adan had moved to the outskirts of Suez City by 1700 hours and Magen had reached the Cairo-Suez road, effectively closing the last line of communication to the surrounded 3rd Army. Additionally, Magen also made the claim for the Israelis of reaching the 101 km marker. This claim placed Israeli forces approximately two hours from Cairo without minimal resistance to prevent their advance. By completing the encirclement of the 3rd Army, the Israelis had violated their original plan of ensuring the Egyptians a way out (Adan, 1980, p. 257).

Unbeknownst to the Israelis, the Egyptians in the 3rd Army sector had already planned for the possibility of an Israeli siege of Suez City. Stockpiling of equipment, supplies, and organizing the civilian militia and civil emergency services began six months prior to the war. Ever since the 1967 war, the Egyptians were faced with the Israelis directly across from Suez City to the east. The Suez garrison thus took steps to better defend the city. With six months of preparations, the Arab attack on 6 October was the early warning the garrison needed to brace for the possibility of an Israeli assault (Rogers, 1979, p. 30).

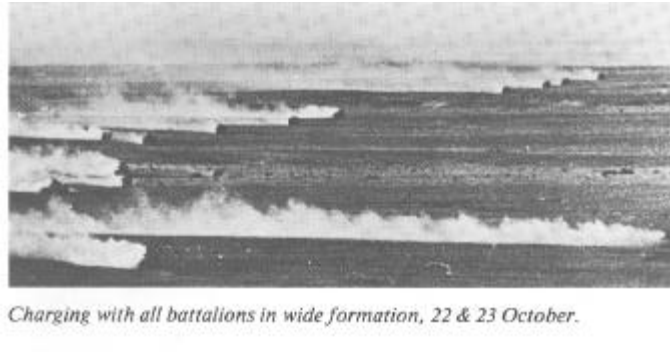


Figure 12. Adan's Division Seizing Ground on the West Bank in Wide Formation
(From: Adan, 1980, Plate).

3. Adan Attacks Suez City

Lead elements of Adan's division arrived on the outskirts of Suez City at approximately 1700 hours on the 23rd. This lead element made a quick attempt to seize a foothold in the city. Based on their small numbers and lack of preparation, the Israelis did not press to gain a foothold once they encountered resistance. This tactic was in keeping with Israeli doctrine. We saw something similar during the breakout into Egypt a few days prior. The only difference here is that Suez was a major built-up area. Essentially, the mission was the same—rapid maneuver and enemy annihilation—it was just the terrain that changed.

Suez City was the port city that controlled and supported the southern end of the Suez Canal. The city was built predominately on the west shore of the northern most part of the Gulf of Suez, running north to south. The city consisted of a city center, residential district, oil refinery, and port facilities, with a population of approximately 200,000 Egyptians. The city center, residential, and industrial areas were all on the western shore while the port facilities and entrance to the canal were on the eastern shore. With the Israeli goal of taking the fight to the enemy's territory, controlling Suez City would be another bargaining chip if the city could be taken prior to the ceasefire.

These three intersections were Aryeh's objectives to cut the city and further isolated the Egyptians.

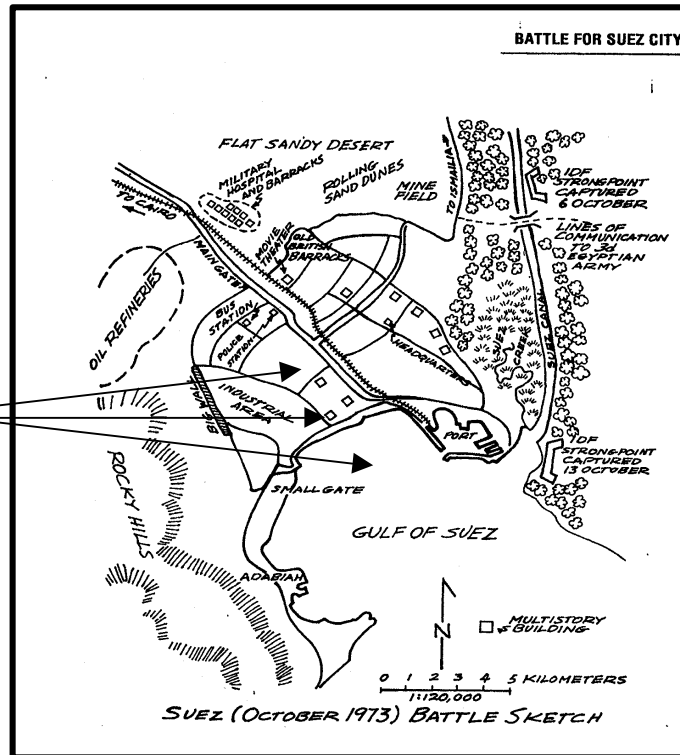


Figure 13. Battle for Suez City (From: Rogers, 1979, p. 33).

With forces moving into position to attack the city, Adan planned for an attack on the morning of the 24th. The ceasefire had been violated the day prior and the race was on again to grab as much territory as possible before the next United Nations (UN) imposed ceasefire. Adan's plan was to attack the city at two key centers, the industrial area with Gabi's¹¹ brigade and the city center with Aryeh's brigade (Adan, 1980, p. 411). As with all the operations during the Israeli offensive, time was critical and hasty attacks were considered worth the risk to seize the city. Adan considered the operation to seize Suez as "...a last-minute, grab-what-you-can action" (Adan, 1980, p. 411). With a second cease-fire scheduled for 0700 hours on the 24th, Adan needed to attack quickly. His two-pronged attack would gain control of the key prizes in the city, these being the port and the industrial area. To gain control of the port, he would first have to seize the main intersections that controlled traffic to the port access causeway. With control of all the major intersections, the Israelis could then control the movement of forces that could influence their hold on the port. Additionally, General Gonen, the Southern Front

¹¹ In Adan's book, *On the Banks of the Suez*, he refers to most of his officers by their first name or nickname. "Gabi" in this case is COL Gavriel Amir. "Aryeh" is COL Aryeh Karen.

Commander, advised Adan to attack Suez “if it is to be a Benghazi, yes; but if it is to be a Stalingrad, no” (O’Ballance, 1978, p. 258).¹² Adan interpreted this as seize the city with the division provided that “if the nut proved too hard to crack, we would forego it...” (Adan, 1980, p. 427).

With only four air sorties to soften targets prior to the attack, Adan began his assault with limited fire support. By 0830 hours, Aryeh’s brigade was clearing a path to the city by mopping up light resistance north of the city in the military camp. Gabi was also meeting light resistance in the industrial and residential sections of the city to the west. With Gabi’s success, Adan pushed Aryeh forward to seize the advantage in the face of light resistance. In lieu of leading with infantry to seize his objective at the Arba’in road junction, Aryeh opted to forego the necessary mission briefs for the late-arriving paratroopers and lead with the armor battalions (Adan, 1980, p. 415). By 0930 hours, Aryeh was making progress moving through the city center, but was being actively engaged by Egyptian anti-tank elements. Obviously a skilled commander, Aryeh wisely attempted to develop the situation during his attack without forcing Adan to commit additional support, “The picture is not yet clear. There are tanks and antitank weapons among the buildings; we are engaged in combat. At this stage I’m holding up in order to get some more artillery support” (Adan, 1980, p. 414). Gabi reported from his sector, “They aren’t giving up, they are still fighting” (Adan, 1980, p. 414).

¹² Benghazi was a key port on the Cyrenaica peninsula of Libya. The taking of Benghazi in February 1941 was a rapid strike by British forces crossing 150 miles of desert to cut the retreat of the Italians. Later in the same campaign, Rommel retook Benghazi in May 1941 without firing a shot as the British withdrew from the port city in full retreat (Collier, 1977, p. 64). In either case, General Gonen makes this reference because he wants the city taken only if it can be done in one swift blow.



Figure 14. Israeli Tanks Halted on the Sarag Road Inside Suez City (From: Zohdy, 1974, p. 120).

Despite the continued resistance, the two Israeli columns continued to press through the city. As they moved deeper into the center of the city, the buildings became higher and the roads became more restrictive for the armor vehicles to maneuver. When Aryeh reached his objective—the Arba'in road junction—his elements came under “a withering blast of fire” (Adan, 1980, p. 414) that rendered the lead battalion virtually leaderless in seconds. Only four officers were still able to function in an attempt to move out of the fire. In spite of the confusion and stiff Egyptian resistance, the column managed to break through to its next objective, the intersection that controlled the causeway access to the port. Yossi’s paratroopers, one of the attached battalions of paratroopers assigned to aid Adan’s division, had fallen behind in the movement on the Sarag road and were now cut off from the advancing armor column. Without support, Yossi’s men took cover in a police station where they would fight for the next 14 hours, surrounded, and take 25% casualties.

Aryeh’s lead elements were now stretched along the length of the Sarag road and he reported back to Adan that they had reached the objectives, but the resistance was too stiff to claim control, casualties were continuing to mount. In a very short time, what had started as a quick operation to seize three key intersections had now become an operation to recover the over-extended forces throughout the city. Adan began to move forces to aid the now besieged elements at the expense of his other division responsibilities to clear

the green belt east of the city. These attempts to relieve the pressure on Aryeh's brigade were also uncoordinated, as the main effort turned from seizure to survival. Throughout the afternoon several attempts had failed to break through or even locate two isolated elements, Yossi's and Hisdai's¹³ battalions. By 1600 hours, a daring raid of armored personnel carriers had located Hisdai's force and evacuated his casualties. With darkness approaching, both Yossi's and Hisdai's forces were left in the city. Adan made the decision to have both elements attempt to escape through the Egyptian positions on foot under the cover of darkness. Hisdai's battalion managed to make the two kilometer movement. No doubt the short distance his unit had to travel and its low number of casualties helped.

Yossi's force faced with an altogether different situation. Lieutenant David Amit "Dudu" had taken over when Yossi was wounded and struck unconscious. The situation worsened as the Egyptians made several attempts to storm the Israeli strongpoint. Over the radio, Aryeh attempted to calm Dudu as well as convince him to break through that night on his own. Because of the number of wounded, Dudu insisted his force be evacuated. By 0230 hours on the 25th Yossi had regained consciousness and agreed with Aryeh's assessment to move by foot to friendly lines. At 0430 hours, the paratroopers had managed to reach friendly lines, ending Adan's first major failure of the war. His attempt at a fast grab of territory had ended in an embarrassing withdrawal.

The results of the Israeli attack were staggering: 80 killed or missing, 120 wounded, and 28 armored vehicles destroyed (Adan, 1980, p. 422). In less than 24 hours, Adan had piecemealed elements of all three brigades into the city fight. By the end, his forces were unable to seize or hold any of the key intersections they planned to use to control the city. Casualties were high with almost no tactical or strategic gains to show for the cost (Adan, 1980, p. 427).

Throughout the day on the 25th, Adan's forces probed the city for a weak point in its defenses, with the aim of launching another attack. As the fighting died down around 1530 hours, the Israelis had not been able to expand their foothold or dislodge the defenders. At the end of the day, the Egyptians still controlled the city center with the

¹³ Similar to Yossi, Hisdai was the commander of another attached paratroop infantry battalion.

Israelis holding the outskirts, the port installations, and the oil refinery. The cost for Adan was again high; ten more armored vehicles were lost in the probes (Rogers, 1979, p. 32). Nevertheless, despite the heavy Israeli losses and the tactical circus that took place on the 24th, Adan had the defending Egyptians in the city besieged. Additionally, with Magen's move to seize the Cairo-Suez road back on the 23rd, the 3rd Army of "some 20,000 men and 250 tanks" remained effectively surrounded (O'Ballance, 1978, p. 262). At 1700 hours on the 25th, the United Nations peacekeepers moved into the city and physically separated the Egyptian and Israeli forces drawn up on the Sarag road. Obviously aware of their predicament, the besieged Egyptian defenders flooded the streets "shouting and cheering and waving their arms" (Adan, 1980, p. 425).

The Israelis abided by the ceasefire on the 26th and 27th yet they continued to prepare for fighting, not only in the city but along the entire front which was still active with continued jockeying and skirmishing. On the 28th, Adan made one more attempt to gain an additional foothold in the city center. He launched a fourth and final attack at about 0600 hours (O'Ballance, p. 264). This push only lasted an hour and does not appear to have been well supported. It was probably intended as another probe to see if the defenders were still in position. But the Israelis did not find a weakness to exploit before the peacekeepers arrived and enforced this final ceasefire. The total losses for the Israeli attacks on the city were 68 officers, 23 pilots, 373 soldiers, and one civilian either dead or wounded (O'Ballance, 1978, p. 262).

D. COMPARATIVE ANALYSIS: ISRAELI BREAKOUT AND THE ATTACK ON SUEZ CITY

Since the 6th of October, Adan and his division had been in the thick of the fighting. They held the Bar Lev Line against the attacking Egyptian armored forces in a seesaw battle for control of the Sinai. As discussed earlier, Adan was masterful in his methodical clearing of the corridor to establish a bridgehead across the Suez Canal. He extensively used infantry to support armor pushes for terrain and also used armor to support the efforts of often-surrounded and always outnumbered paratroopers. So, given such a performance leading up to the battle of Suez, what then happened when this very competent force hit Suez City? Why were Adan's forces not only repulsed but badly mauled by the Egyptian defenders?

According to Glenn Rogers, a US Army officer and author of an article in *Military Review* (1979), Adan failed to use intelligence properly to estimate a defending force and did not use infantry in his attack (Rogers, 1979, p. 33). Rogers, to his credit, does address the Israeli doctrine of leading attacks with armor. This was the tactic used throughout the Israeli crossing and offensive and was again used in the disastrous thrusts into the city. Yet, given Adan's limited objectives of seizing key intersections to *force* the Egyptians out rather than *clear* them out, and his limited time to seize terrain prior to a ceasefire, his aggressive armor advances appear appropriate. In a Naval Postgraduate School thesis, Greg Bendewald (2000) concludes that Adan's efforts show "failures in the critical operational capabilities of C3, ISR, fire support, and the poor tactical maneuvering of forces..."¹⁴ and later says, "In the heat of battle, General Adan seems to have been caught up in the momentum of the Israel's overall success, which rushed him into executing the hasty attack without regard for the need for proper ISR operations" (Bendewald, 2000, p. 25). Both these analyses point to significant shortcomings, but were these the only factors in play during the failed Israeli assault? If one compares Adan's performance just a week prior in the green belt, he did methodically account for the factors he has been criticized for not implementing. Here is where, we believe, the differences in environment affected factors that influenced the performance of Adan's division.

1. Environment

a. Physical Terrain

The terrain of the green belt, west bank, and Suez City obviously differed. The green belt had varying vegetation, numerous cross-cutting ditches, canals, and enough cover to make it impossible to clear an area completely without the enemy occupying the ground at a later time. The west bank of the Sinai was almost featureless, causing numerous problems with navigation and making it difficult to identify rapidly moving friendly forces at a distance. Even though these two areas were physically very different, the Israelis had a strong grasp on how to fight in each environment. In both these areas, the Israelis conducted operations to support their overall maneuver goals and encircle and annihilate enemy forces. The green belt was the key to securing an avenue

¹⁴ C3 refers to Command, Control, and Communication. ISR refers to Intelligence Surveillance and Reconnaissance.

to attack the west bank. In turn, the west bank was favorable ground on which to exploit maneuver abilities. Also worth noting is that the Israelis approached combat differently in each area to further their overall goals of seizing terrain and destroying forces.

The city was a foreign operating environment for the Israelis. The majority of the structures in the city were two-to-three-story residences made of mud brick and stucco. The larger government and commercial structures were multi-story masonry structures. Additionally, there were several large multi-story apartment buildings. Streets varied in width from alleys to multi-lane boulevards that led to the center of the city. The two main arteries were the Cairo-Suez Highway (leaving the city to the northwest) and a road to the northern Sinai town of Ismailia that paralleled the canal (Rogers, 1979, p. 29).

Tactically, the Israelis tried to apply the same concept of using maneuver corridors to attack Suez City. Adan was smart not to try to clear the whole city. He identified the key intersections he wanted to deny to the enemy. In support of these objectives, he also recognized potential high-rise buildings (six to seven stories) that would probably need clearing to support control of the intersections. Adan believed that further encirclement of the Egyptian forces in the city, via seizure of key intersections, would be enough to drive them from the city. Yet, Adan had failed to consider any preparations the Egyptians had made in the event the Israelis did attempt to seize the city.

b. Human Environment

The Egyptians had been planning a defense of the city for six months. The city was stockpiled with supplies and weapons. Civilians had either been evacuated or trained for this scenario (Rogers, 1979, p. 30). Once the Egyptians knew they were surrounded and the Israelis controlled the main avenues of approach into and around the city, the Egyptians realized they needed to think in alternate terms. This they did by conceding the roads to the superior Israeli maneuver forces. The Egyptians then used numerous dismounted movement corridors to resupply and defend the city. This may seem obvious in hindsight, but Adan attacked the city based on his belief that the Egyptians would have to rely on the same routes as his forces and that those routes were

as critical to them as to the Israelis. Here, his logic was flawed: the Egyptians did not need the ability to conduct mounted maneuver in the city. They needed only to defend key strong points.

Had Adan thought in terms of the defender's situation, he may have developed a plan to seize a key portion of the city in the same manner as he brilliantly seized the green belt corridor. Yet, he instead treated the city as though armored maneuver corridors would work there. Beyond the obvious differences in terrain, the differences in analyzing the uses of *specific* terrain are critical. For instance, had Adan been trained in terms of influencing the intersections as opposed to physically controlling them, he may have been able to succeed with less force. The fact that he dominated the Egyptians in maneuver forces and airpower should have suggested the likelihood that the Egyptians would respond with alternate defensive tactics inside the city.

2. Time

Time was an important factor throughout the Israeli offensive. Because of Israel's precarious situation, wedged in the middle of the Arab world, it needed to beat its enemies badly enough to deter them from further encroachment into Israeli territory. This meant maneuvering on the enemy and destroying his forces, preferably in his territory (Adan, 1980, p. 245). These maneuvers required time to plan, resource, and execute. In the case of the Yom Kippur War, this was all done in the face of superpower sponsors and the UN pressure to quickly end the war.

a. Relative Time

Attitudes toward the time available changed for the Israelis at different phases of the offensive. The ability to cross the canal was identified once both the Syrian and Egyptian attacks stalled. The Israelis then estimated they could be ready to cross on the 13th at the earliest with a breakthrough and seizure of the west bank by the 15th. These estimates, of course, were based on assessments of the Egyptians in the Six Day War, and not their current forces. Once it was realized the Egyptians were still holding east bank positions, to include approaches to the canal in the green belt, the Israelis moved methodically to open the corridor. Time was still a factor, but without a secure

bridgehead the breakthrough would not be possible. Here the Israelis took their time and ensured the corridor was secure to support the deployment of the vulnerable bridging equipment.

With the assault across the canal, the Israeli offensive became a race against the start of the ceasefire. Now great risks were being taken to exploit openings and cause the Egyptians to react to the Israeli moves and not vice versa. Large amounts of ground were seized and pockets of resistance were eliminated on the move. Strong points were bypassed and left for follow-on forces. Without a ceasefire pending, these brash actions may not have been taken. On the 19th, Dayan relayed a message to his commanders that the U.S. Secretary of State, Henry Kissinger would be traveling to Moscow to discuss the ceasefire. The Israelis translated this to mean that “Israel might have just three days of combat left” (Adan, 1980, p. 355). With this information, the General Staff issued orders for “territorial grabs.” This attitude toward time continued as Adan and Magen were being pressed each day with new and more demanding objectives. This culminated with the race for terrain on the 22nd, prior to the first ceasefire. Adan carried the trade off of time for terrain into Suez. As his own harshest critic, he addresses his failure to question the benefit of the attack on the city. Given the time constraints inherent in this last-minute, grab-what-you-can venture, he admits his forces were not as well prepared as he would have liked. He cites the lack of planning and attention he paid to preparations for the failures of the main attack on the 24th (Adan, 1980, p. 429). Additionally, he comments on the strategic worth of the city and the cost in taking it vis-à-vis the amount of effort the Israelis wanted to throw into it. While his mission had been to take the city, the caveat to that mission was “provided there is no Stalingrad situation” (Adan, 1980, p. 429). Adan should have responded to the order for the attack with a negative, citing the lack of time to complete the task. In other words, “if we can’t do it right we should not do it at all.”

The nature of the diplomatic battle, with the impending ceasefire, caused the Israelis to take chances they did not take during the crossing operation. It would seem logical that the Israelis would have approached time the same in Suez City as they did in the green belt. But, the push for diplomatic advantage in the settlement to make up

for the heavy Israeli losses early on seems to have been the catalyst to seize as much terrain as possible. If the Israelis had felt they had the luxury of time, Adan would not have had to rush to assault the city.

b. Functional Time

The actions of the Israelis during the bridgehead and breakout operations demonstrated great proficiency in accomplishing individual tasks as part of the larger operations. Even with the delays in clearing the corridor for the bridge, the bridge was assembled quickly to push two brigades across under one period of darkness. As mentioned earlier, Adan had tested and trained for such operations and this was evident in the execution of this complex operation. Additionally, the combined arms efforts of the Israelis to reduce the numerous Egyptian strong points on the west bank was done with precision as the Israelis would advance from one position to another, methodically reducing the defensives. Here again, through solid Israeli training, functional time was understood and applied to the continuous familiar operations being conducted.

In the assaults against Suez City, the Israelis applied the same principles they used during the previous fighting. The Israelis failed to consider the amount of time it would actually take to move to the key intersections in the city and how long they would need to hold them before the Egyptians would withdraw. Additionally, planning, rehearsal, and coordination were non-existent prior to the first morning attack of the 24th. The late arriving paratroopers were simply ordered to follow the armor into the city. No understanding of the time required to complete the assigned tasks was relayed. This could have been corrected through rehearsals or a simple mission brief. If these preparatory tasks were accomplished, upon first contact with the enemy, adjustments to the time required to accomplish the mission could have been made. Regardless of the reason, whether it was poor planning and preparation or a complete lack of time to conduct the preparation, functional time was not a consideration in the city fight as it was in the previous phases of the counter-offensive.

c. Objective Time

The Israelis approached the concept of objective time differently in their push across the canal (and into the west) and their actions in Suez City. During the bridge crossing and breakout operations, fighting was non-stop. Much of the Israeli

advantage came from using the darkness to seize and hold terrain in the greenbelt. Because of the nature of the operation, the bridging was conducted under the cover of darkness, as well as was the crossing operations. The Israeli forces moved directly into combat in the early morning hours of the 18th.

During the breakthrough operations on the west bank, the Israelis fought only during the day. The featureless terrain made it difficult to maneuver during the daytime let alone at night with other units moving simultaneously as well. This perspective, however, changed in the brief actions in Suez City. Adan's first attack on the 24th was planned as an early morning assault not under the cover of darkness. The debacle that followed for the next 14 hours left two paratroop battalions isolated and with no sign of relief as the sun fell. Whereas Hisdai's battalion was able to use the darkness to escape its encirclement, Lieutenant Dudu pleaded with Aryeh to send an armor column the next morning to rescue his battalion. The rescues needed to happen quickly if the wounded were to survive. These movements could only be made in daylight, and with the mass confusion of the failed assaults efforts for recovery were slow to coordinate. The fact an armor column drove by Dudu's defensive position in daylight without making contact with the isolated troops was reason enough to recommend waiting until the next day to attempt the rescue. The complexity of the urban terrain coupled with the uncertainties of darkness was too much for Dudu to recommend an attempt that night. Ironically, the nighttime withdrawal of this element was also time-sensitive, as the paratroopers needed to move at night to cover their escape. The lost hours of debate over whether the unit should move or stay put probably only confused the situation, as each minute passed was one less available to them for moving out.

3. Information

In terms of command and control and the use of intelligence, the Israelis had some hard fought successes early on in the offensive. They managed to maintain strong, deliberate, and hasty planning during the crossing as well as during the breakthrough. Once assaults on them had failed, Missouri Ridge and the Chinese Farm were considered to be objectives that could be contained and dealt with at a later date rather than seized prior to launching the breakthrough. Adaptive command and control in the confusing green belt saved the lives of many Israelis who found themselves defending against

Egyptian counter-attacks rather than mopping up fading resistance. Adan was brilliant in his ability to commit forces on the fly, a must in maneuver warfare. He displayed the same talent on the west bank, as he and Magen, together with two small divisions, effectively encircled the 20,000-man 3rd Egyptian Army. Even though much of the reconnaissance was developed from movement-to-contact battlefield reports, the Israelis were able to piece together the information they needed to secure the corridor and later seize large tracts of the terrain on the west bank.

In the city, the information aspect of the battle was chaotic. Rogers (1979) draws the following conclusions about the Israeli intelligence preparation prior to the assault on Suez:

Israeli attacks failed because of:

- Poor Israeli intelligence on defenses.
- No use of maneuver, no dismounted infantry. (Tanks led the attack.)
- Poor knowledge of Suez – maps, photos, reconnaissance... (p. 33)

Additionally, Bendewald (2000) uses Suez City as his first example of a failed doctrine in attacking a city. He cites Adan's inability to command and control multiple tasks for his division as a contributing factor to the poor preparation for the attack (Bendewald, p. 24). He also cites the lack of any type of reconnaissance being exercised prior to the attacks (Bendewald, p. 22). What neither analysis takes into account is the success the Israelis had using impromptu planning and analysis as the battle developed during the crossing and breakthrough. With Adan's limited objectives to seize specific intersections in the city if his logic held, the use of impromptu analysis would suffice to achieve his goals in the city. Yet, the physical canalization of the city coupled with hasty planning amounted to a recipe for disaster. It was not that Adan did not plan for the use of combined arms; combined arms had been a must for his successful operations in the green belt and breakthrough. The big failure seems to instead lie in the misapplied capabilities of a competent and successful force that was not prepared specifically for urban combat (Adan, 1980, p. 433). This, coupled with time constraints, led to the Israelis' poor informational capabilities.

4. Use of Technology

The Yom Kippur War proved to be an excellent testbed for new weapons. Both the Soviets and the American were pushing new weapons and equipment on their surrogates. Sadat said, “They [the Russians] are drowning me in new arms” (O’Ballance, 1978, p. 33). For the first time in combat anti-tank guided missiles (the U.S. TOW and Soviet Sagger) were used. The bulk of the maneuvering forces were also supplied with newly purchased tanks and APCs. Van Creveld (1975) points out that 3,000 tanks (75% being Arab) were destroyed in the 22-day war. To put this statistic in perspective, the entire tank inventory for all NATO nations combined at the time totaled 9,000 (Van Creveld, p. 47). This statistic not only shows the willingness of the nations involved to allow the attrition of their forces, but also their inability to prevent their own attrition. Tank and anti-tank systems had become far more lethal than the armored protection could withstand.

If one examines combat losses, it is clear that the IDF was the most skilled army involved. The losses show that the Israeli tank gunnery and maneuver capabilities were vastly superior to those of their counterparts. The Israelis also understood the need for proper equipment to support their doctrine and objectives. This was apparent in their training and preparations to support the potential of bridgehead operations. The Israelis were also confident in their abilities to maneuver on and destroy the enemy as a key part of their doctrine. This confidence was relayed to O’Ballance in an interview with an Israeli officer, “This officer told me the Israelis did not think much of the capabilities of the Egyptian tank crews, who, it was said, had to get too close to their targets before they opened fire. Perhaps it was the Israeli armored superiority complex showing through” (O’Ballance, 1978, p. 249). Two points can be drawn from this quote. First, the Israelis understood the full capabilities of the long-range firepower of the tank in maneuver warfare. Second, poor training, in this case of the Egyptians, led a force to incorrectly use equipment. This same pattern is also seen in the Egyptian use of Sagger anti-tank missiles in restrictive short-range terrain, turning these long-range missiles into uncontrollable rockets. This same failure to apply technology can likewise be seen in the desperate use of valuable SAMs in a direct fire role against Israeli tanks (Adan, 1980, p. 351).

Yet, in stark contrast, it seems the Israelis did not have the right expertise or preparation for the Suez fight. As stated previously, seizing objectives for limited gain is one thing; methodically removing an enemy is another. To the Israelis' credit they attempted the former. Yet, even with these limited goals, the combination of tactics and equipment available did not match the competence displayed earlier in the offensive. Again, Adan offers the most trenchant critique. As he puts it:

The capture of a city is always a complicated operation. A city offers many advantages to a defender...So the conquest of a city always involves a good deal of fighting, takes time, and results in substantial losses. Armored forces are not the most suitable for the conquest and mopping up of a built-up area...Nonetheless, in the Armored Corps we had dealt with the subject of capturing built-up areas—though this had been mainly in the realm of theory—including tactical exercises without troops. Live fire ammunition training and exercises were limited due to the lack of suitable sites (built-up areas) for training. (Adan, 1980, p. 428)

Even with the best equipment and overall training available, if a competent force is not prepared to fight in a specific area using its equipment and tactics in a manner that are most suitable, operational failures can result. In the case of Suez City, they did. Adan cites as one potential solution training specific urban combat infantry to deal with similar scenarios and integrating them with mechanized maneuver forces (Adan, 1980, p. 430).

5. Human Factors

a. Limits on the Human System

There is insufficient data available in English or releasable to the public from the Yom Kippur War to truly examine how far the human body and mind can be pushed. In comparison to other campaigns, and even entire wars, combat in this one was relatively short. It lasted only 22 days, with much of the fighting done during daylight hours. Continuous operations were conducted with only limited combat pushes, with resupply and refitting conducted at night. Even so, out of any of the Arab-Israeli wars, the Yom Kippur War appears to have been the toughest test for the Israelis and is replete with examples of difficult situations.

The combat on the southern front was not easy against an enemy well entrenched on key terrain. Up to the attack on Suez City, Adan's division, like most

Israeli forces on the southern front, had been in combat for 17 straight days. Adan describes this as a factor that wore on his men, their morale, and their effectiveness. While clearing the corridor for the bridgehead, his division and attachments were fighting for 48 continuous hours. As he comments, “Perhaps, I thought, perhaps the situation of the Egyptians at the Chinese Farm is no less difficult than that of Uzzi. Perhaps they, too, have suffered losses and are close to the breaking point” (Adan, 1980, p. 290). Here he is referring to Colonel Uzzi’s paratroop brigade, used to clear a portion of the corridor. The mopping up action turned into a 24-hour fight for survival as the Israelis were attacked from all sides. In the end, Uzzi’s men were relieved by an armor breakthrough and pulled back to recover (Adan, 1980, p. 295).

In terms of duration and intensity, the corridor clearing might be considered the hardest fighting of the campaign. In the end, the Israelis had only carved out a narrow corridor to conduct the bridging with enemy strong points still dominating the key terrain of Missouri Ridge to the north and the Chinese Farm to the south. As stated above, Adan was concerned about how much longer Uzzi would be able to hold out against assaults similar to the Israeli ones against the Chinese Farm and Missouri Ridge. If any unit would have broken, it would have been Uzzi’s because of the close and intense violence his unit sustained for 24 hours. Nothing as intense is described for other units in the offensive. The notorious assaults on the Chinese Farm and Missouri Ridge were not as intense as the battles in the green belt. For the most part, the fast-paced maneuver style of combat the Israelis prosecuted limited the proximity and intensity of the fighting with the enemy.

In comparison, the fighting on the 24th in Suez was at close proximity and was extremely intense. Yet, its duration was not equivalent to that of the previous actions. This fighting might have been the hardest for those hours in the city, but the fact it ended by the next morning does not lend it to fair comparison with the in the green belt and how either or both may have tested the limits of the human system.

b. Will and Morale

Will and morale of the Israeli soldier was a definite concern for Adan prior to his crossing of the canal. He was worried about how his soldiers would react on the offense because of the early setbacks suffered two weeks prior.

We had experienced only ‘deluxe wars’ in 1956 and in 1967 – as a result of which I had more than once found myself wondering whether youth that had been raised on such wars could hold out in difficult campaigns in which they might have to retreat at times. (Adan, 1980, p. 259)

Adan was also concerned about the difficulty he expected during this offensive against the Egyptians. He states that he demanded each man be prepared to “...fully exhaust his potential in the offense...” (Adan, 1980, p. 258). To his pleasure, Adan’s division fought well and aggressively throughout the corridor seizure and on the west bank offensive. The Egyptians proved to be a challenge, as they did not retreat; they continued to hold against a more competent maneuver force. In the words of Drew Middleton, military editor of the *New York Times*, “The Egyptian armies did not break. They were outmaneuvered, not outfought. They were still in being” (as cited by O’Ballance, 1978, p. 266). The Israelis, faced with such a resolute enemy, showed that they were capable of hard fighting in wars other than a “deluxe war” to borrow the term.

The fighting in Suez City did not last long enough to cause a visible change in will and morale of the Israeli forces. Even though the actions were brutal, Adan halted the commitment of forces on the 24th when the first attacks fell apart. The Israelis actually showed exceptional composure in reorganizing forces and withdrawing under vicious fire. The best example of this was the withdrawal of Nahum’s battalion in Aryeh’s brigade. “Within twenty minutes twenty of the twenty-four Israeli tank vehicle commanders of the column, who were exposed in their turrets, were killed or wounded” (O’Ballance, 1978, p. 258). Yet, Nahum was still able to recover his force and press through the engagement area. This is a sign of definite martial professionalism under the most confusing of situations. Another example during the city fighting was the raid Adan ordered to recover Hisdai’s casualties. Once Aryeh had located Hisdai’s besieged element, he tasked Ivan to launch a raid with the brigade’s reconnaissance company to recover the wounded. Within minutes, as described by Adan, Ivan’s APCs broke through the Egyptian engagement areas with machine guns firing in all directions and recovered Hisdai’s wounded (Adan, 1980, p. 419). Additionally, Avidor cites other acts of bravery that were common among Israeli soldiers in Suez City.

There were many heroic acts during the battle mainly in the rescue operations – like a M113 driver who crossed the city 3 times – one after the other collecting wounded people after his commanders were killed – or tank commanders running on foot from tank to tank telling the crew that lost their commander what to do next...¹⁵

One example of faltering morale involved Yossi's besieged paratroopers at the city center police station. Having been separated from Aryeh's brigade on the Sarag road, Yossi's element found itself taking heavy fire and dismounted the APCs and buses to take up positions in the surrounding buildings. In a matter of minutes, casualties mounted, to include the battalion commander, Yossi. Lieutenant David Amit "Dudu" took charge and organized a defense of the police station. For 14 hours, the Israelis held off assaults by the surrounding Egyptians. The Israelis maintained the hope they would be rescued, but Adan was not able to mount a rescue to break through to their position four kilometers into the city. Adan cancelled any other attempts as the previous rescue operations had resulted in additional losses. This is one of the greatest paradoxes of combat—how many men does a commander risk to save another?

With no relief coming, Aryeh then needed to persuade Dudu to move on his own to friendly lines. Dudu must have been under immense pressure. His element was disoriented, cut off, and running low on everything. His commander was unconscious, he had more casualties than he could handle, and the Egyptians were continuing to press from all sides. Pleading with Dudu to attempt the movement, Lieutenant Colonel Hisdai, who had just led his element out, attempted to provide encouragement. Eventually, Aryeh, Hisdai, and even General Gonen convinced Dudu the best chance for him and his men was to move on foot at night. This decision was further solidified for Dudu when Yossi regained consciousness and agreed with the plan to evacuate.

Given, the circumstances, Dudu could have frozen and waited unrealistically for relief. He was obviously torn between exfiltrating in small groups with hopes of remaining undetected or moving as a whole group to better defend the wounded. In the end, Aryeh ordered Dudu to move as a large group to offer the best resistance.

¹⁵ This quote is an excerpt from personal email correspondence between the authors and Brigadier General Avidor (retired). This is not published material.

Departing at 0230 hours under an artillery barrage, Yossi's men moved for the next two hours, a distance of four kilometers out of the city (Adan, 1980, pp. 421-422). This example shows how Dudu, even in a brief period of 14 hours, was on the breaking point of making a decision that would seal the fate of his command. Had he given into the basic human desire for survival that was being provided by the relative safety of the building, his force would have been annihilated the next morning. He was required to make a hard decision and rise above his primal concerns—to move back into the same hostile streets that trapped them in the police station in the first place.

c. Ethics and Morality

From the sources examined, violations of ethics and morality do not appear to have been concerns and if violations had occurred they were not publicly recorded. Additionally, where the actions prior to the fighting in Suez City could have provided opportunities to commit such acts, the city fighting did not last long enough to see these effects. The only instances that can be considered potential abuses were the three violations of ceasefires. Between the 21st and 28th of October, three ceasefires were violated. The Israelis deliberately violated all three ceasefires in continued efforts to seize terrain during the counteroffensive. The latter two violations occurred during probing operations in the city. Even though these actions occurred during the attacks on Suez City, they cannot be specifically attributed to the urban fighting as skirmishes, probing, and shelling were ongoing between the two armies. Such actions had been ongoing since the Six Day War in 1967 until 1970. This period is commonly referred to as the War of Attrition (O'Ballance, 1978, p. 2). In fact, even after the UN upheld the final ceasefire of 28 October, the Egyptians and Israelis continued to exchange fire in the second War of Attrition until the Israeli withdrawal from the Suez Canal zone in March 1974 (O'Ballance, 1978, p. 268).

6. Decision Making

What are the real effects of all these factors discussed? They all affect decisions made, as well as decisions yet to be made. In turn, some decisions, whether political or military, caused these factors to have more of an effect than they would under other

circumstances. For example, the factor of time available played on the minds of the Israelis throughout the offensive. Had political pressures been taken out of the equation, time would have been less critical and Adan would not have said:

...we faced many concrete problems of which the main one was the lack of infantry in the intended zone of combat. It would take time to move the infantry from the Bitter Lake area to Suez City...and time was just what we did not have. The ceasefire was imminent. (Adan, 1980, p. 427)

Decision-making during the crossing and breakthrough seemed more natural for the Israelis with each action leading to the next in a clear sequence. Even the predictions of potential Egyptian counter-moves were all met with confidence by the Israelis. Objectives surrounding these decisions also seemed clear and decisive. Even though concerns about casualties were always present, they did not slow the offensive. The Israelis maintained the approved plan to annihilate Egyptian forces.

The decision to attack Suez City initially presented a continuation of the same quick grabs the Israelis had been executing the few days prior to the 24th. General Gonen's guidance, "... but if it is to be a Stalingrad, no" (O'Ballance, 1978, p. 258) was in keeping with the Israeli doctrine of encircling and bypassing strong points. While the decision to attempt the attack was sound in that regard, clear limitations were placed on the costs the Israelis were willing to incur. Unfortunately, high costs came very quickly and were unforeseen given the light resistance in the city that was expected (Adan, 1980, p. 430).

Regardless of the weak assumptions about enemy strength, significant tactical mistakes were also made. Even with the light resistance expected, Aryeh should have waited for the paratroopers and integrated them into his lead battalion on the 24th. By moving without the paratroopers, Aryeh did not apply the combined arms doctrine the Israelis had used previously. Additionally, Adan points out that, in hindsight, the decision to attack lacked any strategic advantage and should not have been undertaken (Adan, 1980, p. 427). While it is unclear why certain decisions were made—no doubt many were made in the heat of battle—there is a marked difference between the quality of decisions made during the crossing and breakthrough phase and those made about

Suez City. It seems all the calculated assessments to achieve victory ended with Magen's seizure of the Cairo-Suez road, and that the operations to seize the city itself were only a bloody after thought.

E. CONCLUSION

The Israeli offensive operations in the southern theater illustrate differences in how the Israelis undertook combat in two different environments. It is clear in this comparison that the Israelis were more comfortable and competent in fighting using maneuver-style tactics than urban fighting. Additionally, this case demonstrates that different types of operations and environments require different approaches to various but ever-present factors in warfare. This is clearly evident in the comparison of physical environments, time, informational considerations, use of technology, and decision-making. The comparison of human factors in the two environments suggests, but does not prove, that urban fighting is more intense than maneuver warfare. Beyond that, the brevity of the conflict makes it difficult to highlight significant differences when it comes to the effects of two such different environments on these elusive human factors.

Table 2 highlights the qualitative comparison of how the two different environments affected the performance of Adan's division in the areas of our 5 factors. The Israelis performed the worst in managing information. Detailed rehearsals, established doctrine, and a dispersed and fluid execution in the bridging and breakout were successful compared to what occurred in Suez City. Another significant difference was how the Israelis used their available technology so well in the bridging and breakout, yet so poorly in the city fighting. Decision-making reflected the same imbalance. Through solid training, the Israelis did mitigate for the different facets of time well. But due to poor preparations and decisions, their use of time was degraded in the city fighting.

Table 2. Effects of the Factors on Operational Performance of Israeli Forces Between the Two Environments. Scale: Bad Effect (---) to Good Effect (+++).

Environment	Time	Information	Technology	Human Factors	Decision-making
Urban	(--)	(---)	(--)	Data inconclusive	(--)
Non-urban	(+)	(++)	(+++)	Data inconclusive	(+++)

Early in our research on urban warfare, we hypothesized that some factors in urban warfare are interrelated and create a magnified effect. What the analysis of these factors has since shown, particularly in the context of the Israeli actions in Suez City, is that a number of these factors will converge at key moments in the battle.

The vignette that illustrates this point most dramatically is the case of Lieutenant Dudu at the police station. Each of the factors analyzed above were involved in Dudu's situation and eventually weighed on the decision he had to make. He was affected by the interaction of the environment with the factors of time, informational capabilities, and will and morale simultaneously. These all played into his ability to make the right decision. Indeed, just the fact of convergence made his situation more difficult. There is no need for an equation or a model to demonstrate this. Dudu appears to have been overwhelmed by the chaotic convergence of all the factors that are always present in warfare. Only if he or his superiors had been able to mitigate the effects of some of these factors, perhaps his situation might have seemed less dire or traumatic when it came time for him to lead his men back into the street.¹⁶

¹⁶ In recent history, American elements surrounded in similar circumstances faced the same convergence of factors during the Battle of Mogadishu, 3 October 1993.

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IV. UNITED STATES MARINE CORPS OFFENSIVE OPERATIONS IN I CORPS SECTOR, REPUBLIC OF VIETNAM 1967-68

A. BACKGROUND

Vietnam was America's longest war. Starting with advisory missions in the late 1950s and early 1960s, this involvement ballooned to a direct combat role for U.S. ground forces in 1965. The story of the United States Marine Corps (USMC) in Vietnam is part of this legacy. Its role in ground combat operations illustrates the successes and challenges of both traditional rural and jungle fighting, as well as the brutal urban fighting encountered in Hue during the Tet Offensive of 1968.

The USMC force build-up began with the landing of the 9th Marine Expeditionary Forces at Da Nang in March, 1965. One month later, President Johnson authorized the use of U.S. forces to conduct ground combat operations. From this point, U.S. forces would build up to 184,300 personnel by the end of 1965 and continue to over 319,000 personnel by the end of 1967 (Willbanks, 2003, p. 1). By the beginning of 1968, the Marine totals were approximately 69,650 personnel on duty in Vietnam (Telfer, Rogers, & Fleming, 1984, p. 323). As part of this build up, the III Marine Amphibious Force (MAF) was assigned to the Vietnamese Military I Corps Tactical Zone in the northernmost provinces of the Republic of Vietnam. The Third Marine Amphibious Force (III MAF) was made up of two Marine divisions, the 1st and the 3rd. Additionally, the III MAF had Support Landing Forces (SLF) that operated from Amphibious Ready Groups (ARGs) off the coast of Vietnam. With this substantial force, the Marines were in a good position to counter the increasing number of North Vietnamese Army (NVA) regular units that were moving south from the Demilitarized Zone (DMZ) on the 17th Parallel. 1967 and 1968 marked a departure from insurgency-type warfare and the beginning of the clash of conventional forces. The Americans always wanted the communists to fight openly, and during much of the action in I Corps Tactical Zone in 1967 the NVA gave them what they asked for.

B. THE NATURE AND CONDUCT OF UNITED STATES MARINE CORPS OFFENSIVE OPERATIONS IN I CORPS TACTICAL ZONE

1. General

For the purposes of this study, an examination of the nature of USMC offensive operations in 1967 will serve as the (non-urban) baseline for comparing with Marine actions during the battle for Hue in 1968. Since Marine operations typically involved the maneuver of multiple battalion-sized elements, many operations involved battalions from different Marine regiments fighting side-by-side. Because of this, it is not possible to analyze the specific units in terms of how they fought in Hue versus previously in other battles. Additionally, high turnover of servicemen during the Vietnam War makes it difficult to examine a specific unit with the same personnel. Instead, we have opted to develop a more general understanding of the nature of Marine offensive operations against the NVA. The two examples of USMC ground operations selected are from a series of operations conducted by the 1st Marine Division in the highly contested agricultural region of the Que Son Basin. Each example demonstrates how typical, multi-battalion Marine operations were conducted in the year prior to the Tet Offensive.

2. Search and Destroy

In an effort to remove active communist military action, Marine operations typically consisted of “sweeping back and forth across a cordoned area” (Telfer et al., 1984, p. 52). In *U.S. Marines in Vietnam: Fighting the North Vietnamese 1967*, these operations are further described,

...such actions established a tedious balance in the ‘cat-and-mouse’ game subduing local guerrillas, operations of a larger scale, responding to confirmed intelligence reports, attempted to smash larger, established communist concentrations. (Telfer et al., 1984, p. 52)

These operations were also known by the popular term “search and destroy”. Many of these smaller, company-size operations were conducted as a part of the extensive pacification campaign throughout the I Corps Tactical Zone. In numerous provinces, both the communist and South Vietnamese governments were in competition to control areas with rich farmland. One of these areas was the Que Son Basin. Control of this area and its agriculture was considered the key to controlling all five Northern provinces because of its large output of rice and other agriculture (Telfer et al., 1984, p.

63). Given the sheer bulk of these continuous operations as described above, major operations were focused on larger formations of communist forces which were normally NVA regular units attempting to fight toe-to-toe with the better trained and equipped U.S. and Republic of Vietnam forces.

3. Operation Union

The Union series of operations marked the beginning of the struggle with the NVA for control of the Que Son Basin. Opposing the Marines in the basin was the 2nd NVA Division. In early 1967, elements of 2nd Battalion, 1st Marine Regiment (2-1 Marines) moved into the basin to relieve the Army of the Republic of Vietnam (ARVN) outpost at Nui Loc Son. In a few months, F Company, 2nd Battalion, 1st Marines (F/2-1 Marines), was able to reduce NVA/Viet Cong (VC) control over the rice-producing basin. The Marines also initiated badly needed civic action projects to gain popular support and gather intelligence. Their third aim was to force the 2nd NVA Division into open combat (Telfer et al., 1984, p. 64). By mid-April 1967, things were falling into place. The NVA were moving into the basin to counter the American presence. By 17 April, the NVA had infiltrated two regiments, the 3rd and 21st, into the basin to assault the Company F outpost at Nui Loc Son Base.

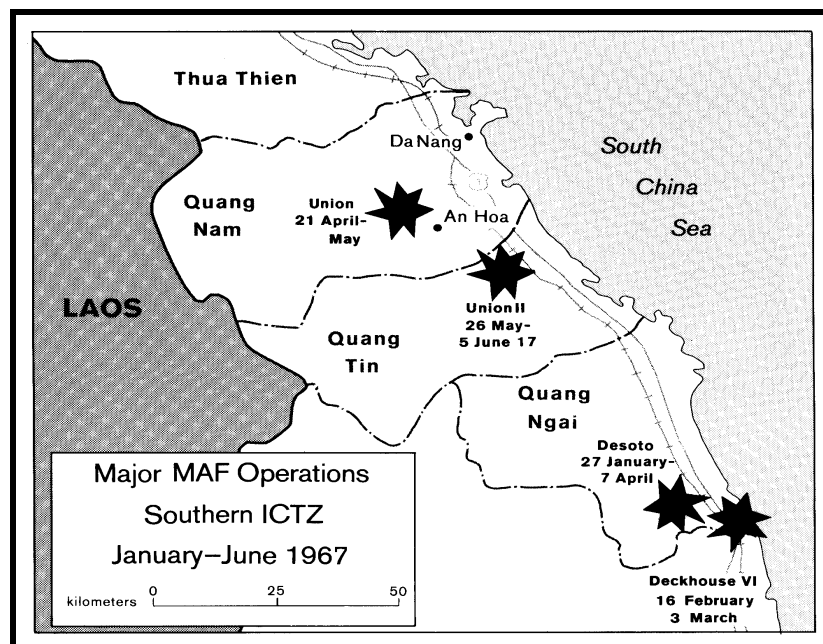


Figure 15. USMC Operations in I Corps Tactical Zone (ICTZ). Note Locations of Union I and II (From: Telfer et al., 1984, p. 74).

With the Company F outpost as the bait, Colonel Radic, the 1st Marine Regimental Commander, planned to initiate contact with the NVA elements by using a heliborne insertion of three battalions and artillery fire support. On 21 April, F/2-1 made the initial contact with NVA elements in the neighboring village of Binh Son. While F/2-1 conducted the majority of the fighting, rapid airmobile deployment of the other three American battalions, the remainder of 1-1, 3-1, 3-5 Marines, and fire support allowed all elements to be engaged by early on April 22nd. As was typical of NVA contacts with American ground forces, the NVA broke contact with the Marines after only two days of fighting. Radic's plan nevertheless worked, as the three maneuver battalions were able to push the NVA north, inflicting "severe casualties" (Telfer et al., 1984, p. 65).

The sweeping of the basin continued until 10 May, when two battalions conducted a classic movement-to-contact against an enemy strong point on Hill 110. Company C of 1-5 Marines was moving on the slope of Hill 110 when it encountered heavy fire. The company was able to clear the hilltop, but the element was still taking heavy fire from another hill to the east. The company commander called for help and two companies of 1-3 Marines' Battalion Landing Force (BLF) moved in from the north side of Hill 110 to aid the isolated company of Marines. From here, the two companies shifted operational control over to the battalion commander of 1-5 Marines, Lieutenant Colonel Hilgartner. Even with the extra companies to aid Company C, friendly and enemy forces were too close together to concentrate effective direct fire, artillery, and air support. With the additional BLF companies halted, Hilgartner called on his Company A operating two kilometers to the east of the action. When Company A arrived to aid the BLF companies, an air controller mistakenly directed a close air support (CAS) strike onto their position, killing five and wounding 24 more Marines and ruining another chance to aid Company C.

By 1500, Hilgartner's command group and Company D had moved to a commanding position south of the battlefield. At 1530, Company M, 3-5 Marines landed near Hilgartner's support-by-fire position. With these reinforcements, Hilgartner was able to consolidate his forces and coordinate cover fire so the BLF companies could maneuver on the enemy entrenchment from the north. By the evening, Hilgartner's

Marines forced the NVA to withdraw under continual harassing artillery fire and CAS. The next morning, the Marines found 116 NVA dead, having suffered 33 killed and 135 wounded themselves.



Figure 16. Marines Search the Rugged Terrain of the Que Son Basin During Operation Union II (From: Telfer et al., 1984, p. 73).

On 12 May, the BLF returned to their ships off the coast, while the 1-1 Marines and the two battalions from the 5th Marines continued to conduct sweeping operations through the basin for five more days. On the 12th and 13th, the Marines were in constant contact with platoon and company size forces. By the evening of the 13th, 3-5 Marines accounted for 122 enemy dead during the continued sweep with the aid of air strikes and artillery. This pattern continued on the 14th and 15th as Company D of 1-5 and Company M of 3-5, used extensively artillery and air strikes to soften enemy positions. The Marines in this later stage of Operation Union met enemy resistance light enough to be handled by company level efforts.

After 27 days, Colonel Houghton, the 5th Marine Regiment Commander, closed down the operation on 17 May. The Marines accounted for 865 enemy dead, with 486 NVA among those losses. In contrast, the Marines lost 110 killed, 473 wounded, and two missing. Colonel Houghton considered the lengthy operation a success.

The prolonged operations by the 5th Marines in the agriculturally rich Hiep Duc-Que-Son-Thang Binh corridor broke the VC control of the area that had spanned almost twenty years...the enemy loss in prestige in the eyes of the people is readily apparent. The psychological impact of Operation Union equaled or even exceeded the material damage to the Communist effort in this area of operations. (as cited by Telfer et al., 1984, p. 68)

4. Operation Union II

With the success of Union I, III MAF planned a continuation of operations in the Que Son Basin. After the withdrawal of elements of the 2nd NVA Division, the Nui Loc Son Base continued to report an increase of activity in the basin. Union II was the response to this continued enemy activity. As in Operation Union I, III MAF designated the 5th Marine Regiment to be the operation's main effort. On 26 May, the operation commenced with 1st Battalion serving in a blocking position along the western side of the basin, while 3-5 Marines conducted a heliborne assault to "sweep" northwest towards the 1-5 position (Telfer et al., 1984, p. 68). Additionally, the two battalions of the 5th Marines worked in concert with an ARVN Ranger element and the 6th ARVN Infantry Regiment. Both South Vietnamese units attacked along two additional axes of advance to further prevent enemy withdrawal.

By 1143 hours on the 26th, 3-5 Marines completed their heliborne assault and were caught in heavy fire on the landing zone. Companies L and M moved north to attempt to remove pressure on the landing zone, while Company I moved to envelop the enemy position. By 1630 hours that day, the Marines were able to overrun the enemy position at the cost of 38 killed and 82 wounded Marines. The Marines accounted for 118 NVA dead.

On 30 May, Colonel Houghton shifted his efforts to the hills on the southern rim of the basin. The sweeps met only light resistance and scattered sniper fire on the 30th and the 1st of June. On 2 June, Colonel Houghton moved two battalions abreast to continue the sweep. Each battalion, in turn, used two companies abreast, with one in reserve. By 0930 hours that morning, the lead companies of 3-5 Marines were under heavy fire on their sweep. While 3-5 was unable to advance, 1-5 Marines maneuvered to the north in an attempt to envelop the enemy position. Before they could complete the maneuver, 1st Battalion elements needed to cross a one-kilometer rice paddy. The enemy position holding 3rd Battalion in place was anchored with elements over-watching the rice paddy. Immediately, lead elements of 1st Battalion were pinned down in the middle of the open rice paddy by entrenched NVA.

With two battalions now pinned and unable to support one another, Colonel Houghton asked the 1st Marine Division commander to commit the division reserve, 2nd Battalion, 5th Marines. Major General Robertson authorized the reinforcements and by late afternoon Lieutenant Colonel Jackson with one of his own companies and two companies from 1st Battalion, 7th Marines landed north of the NVA position. By nightfall, only two companies had reached the landing zone. Needing to relieve the pressure on the other two battalions, Jackson initiated the attack with the two available companies. His battalion immediately made contact with the rearguard of a withdrawing NVA element. With Jackson's 2nd Battalion now moving unimpeded to their flank, the NVA began a complete withdrawal from their defensive positions. This allowed the Marines to capitalize on the large formations of troops moving in the open by directing artillery and close air support onto the exposed enemy.

By morning, the NVA had withdrawn from their positions and both sides had begun to collect the dead from the battlefield. "For the remainder of the day, there was an undeclared truce; the two sides intermingled but ignored each other as they went about collecting their dead" (Telfer et al., 1984, p. 74). With this informal truce, Operation Union II concluded, with the Marines having suffered 110 killed and 241 wounded. The NVA is estimated to have incurred substantial losses from the operation, with 701 killed and 23 prisoners of war (POW). Even with a continuation of the heavy losses experienced during Union I, the casualties from Union II were considered to have produced a "favorable ratio" (Telfer et al., 1984, p. 74).

Both the Union operations were typical "search and destroy" operations during that phase of the war. The American forces utilized all the assets available to them at the time. Overwhelming fire support from both artillery and close air support were vital to inflict casualties and force the NVA to withdraw during actions in both operations. The Marines were also able to utilize heliborne capabilities to conduct rapid vertical envelopment of the enemy with limited notice. The numerous open areas scattered throughout the basin made it easy to conduct these airmobile movements. This vastly increased their maneuver capability. During the last engagement of Union II, two fresh

companies were engaging enemy forces within only five hours of notification. Even with these technological advantages over the NVA, who were mostly restricted to what they could carry on their backs, these operations were long, exhausting, and bloody.

Despite 220 dead and 714 wounded and two missing over the two operations, the Marine leadership still considered these operations successes. This is perhaps because of the number of enemy losses in the heavy fighting, approximately 1,700 killed or captured. Overall, the exchange ratio of casualties inflicted was about 2:1 in favor of the Americans. Additionally, both Union operations were multiple-battalion infantry operations well supported by a compliment of air transport, artillery, and CAS all engaging multiple NVA regiments. With large-size elements like this, the casualty figures appear a high cost for ground that was not held. However, it is important to recognize these operations represent 28 days of combat conducted by successfully synchronized efforts of five Marine battalions attacking an enemy in prepared defenses. Given the need to have the traditional ratio of attacker to defender at 3:1, the Union series appears not only a success in temporarily driving the NVA out of the Que Son Basin but also signifies the mettle of the men of the 1st Marine Division in attacking an enemy of superior numbers in defensive positions. As we will see at Hue, this was to become the norm.

C. UNITED STATES MARINE CORPS' ROLE IN OPERATION "HUE CITY"

1. The Tet Offensive, 1968

A dramatic increase in U.S. ground forces and aggressive operations such as the Union series caused a stalemate by the summer of 1967 (Willbanks, 2003, p. 2). The Hanoi-based communist government planned for a general offensive that would break the stalemate and "convince the Americans the war was unwinnable" (Willbanks, 2003, p. 2). By the fall of 1967, the communist plan was in motion as large troop concentrations began with direct attacks across the DMZ and in Vietnam's Central Highlands. One of the key attacks to draw American attention away from the real objectives of untouched urban infrastructure in the south was the attempt to seize the American base at Khe Sanh in northwestern South Vietnam. With two NVA divisions laying siege to the isolated

base, President Johnson believed an NVA victory would replicate that over the French at Dien Bien Phu in 1954. As a consequence, President Johnson vowed Khe Sanh would not fall.

As American attention and military efforts were pulled towards Khe Sanh, the communists executed their massive attack in the early morning of 31 January 1968 with approximately 100,000 NVA and Viet Cong forces dedicated to target population centers including “36 of 43 provincial capitals, 5 of 6 autonomous cities, 64 of 242 district capitals” throughout South Vietnam (Krepinevich, 1986, p. 239). Both Saigon and Hue were among these objectives. This attack took advantage of the Tet¹⁷ annual ceasefire that had been traditionally honored by both sides.

2. The Battle for Hue

While many of the battles in the smaller cities and towns ended quickly, the Battle for Hue would be the longest, bloodiest, and most storied battle of the Tet Offensive. Located 100 miles south of the DMZ in the province of Thua Thien, Hue was the provincial capital and the most historic city in Vietnam. It was the old imperial capital and was a cultural and historical center for all Vietnamese, Northerners and Southerners. The city was also home to the 1st ARVN Division and a United States Military Assistance Command Vietnam (MACV) compound. Additionally, Hue was on the main supply route for American and South Vietnamese supplies coming from the port city of Da Nang. Even with the South’s military presence in Hue, the city’s venerated status kept it an open city; and, until January 1968, it had remained free of war.

In the early morning hours on 31 January 1968, elements of the 2nd NVA Division and local Viet Cong elements began their attack on Hue. By mid-morning, the Communists had seized key intersections and government buildings and were laying siege to the American MACV compound and the 1st ARVN Division Headquarters in the Citadel. By noon, Viet Cong political officers were eagerly on the streets with lists of South Vietnamese, Americans, and other foreigners to detain. As relayed in Eric Hammel’s *Fire in the Streets* (1991), the following scene was typical of communist actions,

¹⁷ Tet is the name of the Vietnamese Lunar New Year.

“Listen carefully,” the VC commander said. “You are allowed to go home.” Everyone instantly stood up, ready to leave but the Communist officer yelled, “Sit down again! I mean only the women and small children. All the men, go over there.” He pointed in the direction of a vacant lot. Immediately, soldiers began pushing all the men to the lot. (Hammel, 1991, p. 55)

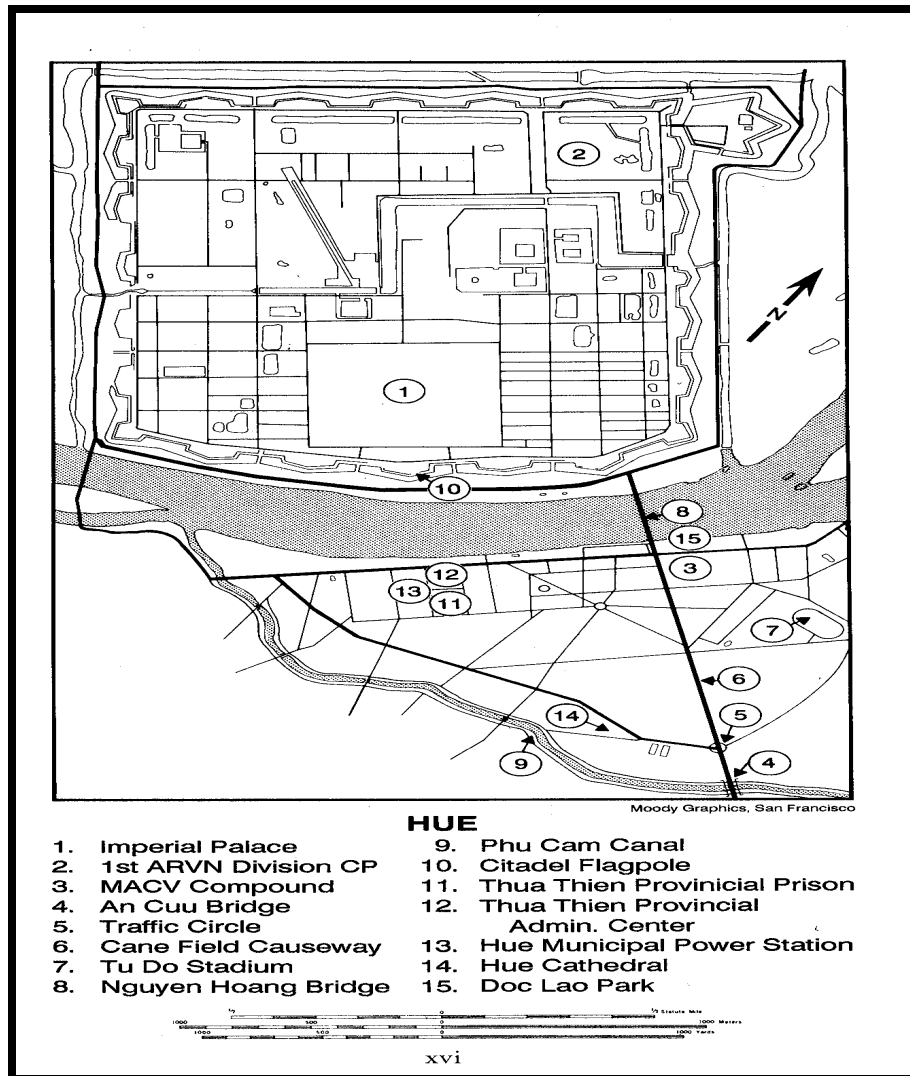


Figure 17. Hue City (From: Hammel, 1991, p. xvi).

The fate of these detainees and others like them was not discovered until after the ARVN and American forces had cleared the Citadel weeks later. Approximately 3,000 civilians were massacred and buried in mass graves (Willbanks, 2003, p. 12).

With the fog of war looming over Hue on the morning of 31 January, both the 1st ARVN Division commander, Brigadier General Truong, and the advisors in the

American MACV compound were unaware of the extent of the Communist offensive, yet both commands were quick to request reinforcements. Since Hue was located in the I Corps Tactical Zone, III MAF received the request to break the siege on the MACV compound. That day, Lieutenant General Cushman, commander of III MAF, ordered Task X-Ray of the 1st Marine Division to relieve the MACV advisors.

On orders from Brigadier General LaHue, the Task Force X-Ray commander, the Phu Bai designated reaction force, Company A, 1st Battalion, 1st Marines (A/1-1) was to aid the advisors. With limited information about the length of the operation or the strength of Communists in Hue, Captain Batcheller hastily led his company on the eight-mile movement north from Phu Bai soon after sunrise on the 31st. Meeting up with four M-48 tanks moving north to the DMZ, Batcheller pressed forward, slowly encountering sniper fire and clearing buildings along the route. As A/1-1's convoy crossed the An Cuu Bridge and entered the southern portion of Hue, the Marines were caught in an intense crossfire of automatic weapons and B-40 rockets. Pinned down under the withering fire, with casualties mounting, Batcheller called for help from his battalion commander, Lieutenant Colonel Gravel. With Company A in desperate need of help, Gravel hastily organized what men he had available from his command group and the only infantry company currently at Phu Bai, Company G, 2nd Battalion, 5th Marines (G/2-5). Without time to properly organize his Marines for the relief mission, Gravel's element moved towards Hue with two missions, to relieve the MACV compound and to rescue his Company A. He managed to accomplish both by 1515 hours on 31 January and the cost to the Marines by that time had already been 10 killed and 30 wounded.

With the MACV compound secured, LaHue ordered Gravel to cross the Song Huong (Perfume River) with his makeshift battalion of two companies, four tanks, and two 40mm Duster anti-aircraft guns to relieve the besieged ARVN command post within the Citadel. Under protest, Gravel advanced with Company G and three of the four M-48 tanks and several additional tanks from the 7th ARVN Cavalry Squadron. With the armor covering the south side of the Song Huong, Company G crossed the Nguyen Hoang Bridge leading to the Citadel.



Figure 18. The Citadel in Hue (From: Urban Operations Journal).

Met immediately with intense fire, 10 Marines were hit, while two platoons plunged forward over the bridge in an attempt to find a breach in the Citadel walls. Badly outnumbered and under heavy fire, Gravel pulled Company G back from the north side of the river. In the two-hour fight, one third of Company G was either killed or wounded. CPT Meadows, the Company G commander, recalled that most of the casualties occurred while “going across that one bridge and then getting back across that bridge” (as cited by Shulimson, Blasiol, Smith, & Dawson, 1997, p. 174)¹⁸.

With the intelligence situation still not clear as to the enemy’s hold on Hue, plans to retake the city were being considered all the way up the chain of command from LaHue at Task Force X-Ray to General Westmoreland in Saigon and finally to General Wheeler, the Chairman of the Joint Chiefs. At each level, these plans were based on faulty and grossly underestimated enemy strengths in the city. With the Tet Offensive still raging throughout South Vietnam, this intelligence failure “resulted in insufficient forces being allocated for retaking the city” (Willbanks, 2003, p. 17). The plan initially called for a division of effort within the city, with the ARVN forces to secure and clear north of the Song Huong and the Marines clearing the south side. Since Hue was the most beloved city in Vietnam, neither the ARVN nor the American leadership was willing to risk the potential political repercussions of seeing the ancient capital in ruins, thus rules of engagement were important (Willbanks, 2003, p. 18). Lieutenant General

¹⁸ This source is a volume in the official USMC history series. Because it is based on unit after action reports (AAR) and first hand accounts, this source is considered by the authors of this study to be a compilation of primary sources. Other sources used in this study have cited this work as a reference.

Cushman later commented, “I wasn’t about to open up on the old palace and all the historical buildings in there. I told Lam [I Corps Commander] he was going to have to do it” (Shulimson et al., 1997, p. 176).

From the 2nd through the 10th of February, the Marines painstakingly cleared the southern portion of the city. Gravel was ordered on the 2nd to move six blocks from the MACV compound and seize the Thua Thien Province headquarters. His two-company battalion did not make it a block before they were turned back by the enemy defenses. As one Marine of Company G recalled, “We didn’t get a block away [from the MACV compound] when we started getting sniper fire. We got a tank...went a block, turned right and received 57mm recoilless which put out our tank” (as cited by Willbanks, 2003, p. 20). With Gravel’s failed efforts, Colonel Hughes, the 1st Marine Regiment commander, took control of the battle personally, promised Gravel reinforcements, and ordered him to conduct “sweep and clear operations...to destroy enemy forces, protect U.S. Nationals and restore that (southern) portion of the city to U.S. control” (as cited by Willbanks, 2003, p. 21). Gravel would continue efforts to reach his objectives on the south side of the city with limited success for the rest of the day. The arrival of 2-5 Marines and Colonel Hughes with the 1st Marine Regimental staff that evening began to change the complexion of the battle.

From the 3rd to the 10th, 2-5 Marines took over the main effort of clearing the southern portion of the city. Since Gravel’s battalion only consisted of approximately one and a half companies of combat effective Marines, his force was unable to complete the mission and was placed in a supporting role. Lieutenant Colonel Cheatham, the 2-5 Marine commander, was given guidance to secure the key structures on the south side. The first objectives were the public health building, the treasury office, and the post office. After their initiation in urban combat on the 3rd, where Cheatham’s battalion “was exactly where we [1-1 Marines] left them”, the Marines were able to secure all three objectives by the 5th (Shulimson, et al., 1997, p. 180). Cheatham continued to press the attack each day with the prison and provincial headquarters office being taken by the evening of the 6th. Fighting continued through the 10th, when the only remaining resistance was sporadic sniper fire in the southern side of the city.



Figure 19. Fighting in the Citadel (From: Urban Operations Journal).

The fighting the first 11 days in Hue effectively broke the 4th NVA regiment that had defended that part of the city. For the rest of the battle, the 4th Regiment “ceased to be a strategically relevant factor in the battle for Hue” (Hammel, 1991, p. 239). By this stage in the battle, the NVA losses were 1,000 killed, 6 POWs and 89 detained for questioning. The U.S. losses were 38 killed and 320 wounded (Shulimson et al., 1997, p. 191).

With the 2-5 Marines exhausted and still mopping up on the south side of the Song Huong, fresh reinforcements were called in to help clear the Citadel. The original plan, decided between Lieutenant General Cushman (the III MAF commander), and Lieutenant General Lam, (the I Corps commander), called for South Vietnamese forces to clear the Citadel. The badly surprised and isolated 1st ARVN Division made little progress against enemy positions in the ancient city. The Marines were called on once again to help complete the mission. 1-5, under the command of Major Thompson, was airlifted by helicopter and moved by landing craft to the besieged ARVN Mang Ca compound on February 11th.

With orders to aid in the clearing of the Citadel, 1-5 moved out of the Mang Ca compound on the 13th. With two companies abreast and one in reserve, Thompson pushed into this assigned sector of the Citadel. The 1-5 Marines quickly met with resistance from an archway tower on the east wall of the Citadel. The NVA had entrenched themselves at the base of the tower, making it difficult to approach or use artillery to disrupt the position with the remaining option of small arms. Just as 1-1 and

2-5 were baptized in the urban arena - so was 1-5 Marines. It took three days of heavy fighting with the support of Marine field artillery and naval gunfire to reduce the “tower” and push the NVA out of their defensive positions. What it cost to take the “tower” was the same for other Marine objectives in this battle – high casualties. Six Marines were killed, with 30 more wounded. All in exchange for 20 enemy killed and that section of the Citadel wall.

With the tower taken, Major Thompson renewed the attack southeast along the Citadel wall. For another seven days, 1-5 fought “meter by meter” with intense close quarter combat in a “defender’s paradise” against a resolute enemy well trained in urban fighting (Willbanks, 2003, p. 32). By the 17th, 1-5 Marines had suffered 47 killed and 240 wounded in only five days of fighting. Major Thompson’s Marines were becoming completely exhausted by the non-stop fighting. Casualties were mounting with medical personnel unable to keep up with the need for aid. After a day to rest and refit on the 18th, Thompson, with remnants of a Marine infantry battalion, was ready to push forward to secure the east wall of the Citadel (Willbanks, 2003, p. 34).



Figure 20. Casualty Evacuation in the Urban Environment (From: Urban Operations Journal).

To aid the Allies in their push on the Citadel, the rules of engagement (ROE) had been relaxed, allowing for the extensive use of artillery and CAS. Vice President Ky of the Republic of Vietnam stated the enemy is willing to sacrifice “thousands of men to win a slight political gain” (as cited by Shulimson, et al., 1997, p. 205). He additionally declared “U.S. forces should not allow the enemy use of pagodas, churches, and other religious symbolic buildings to deter their advance and that he would ‘accept responsibility’ for any destruction (Shulimson, et al., 1997, p. 205). With this, continued offensive efforts were made with a rolling barrage of artillery and CAS. The downside of lifting the restrictions was that 40% of Hue was reduced to rubble by the end of the battle (Willbanks, 2003, p. 33).

By the 21st, Major Thompson’s battalion had reached its limit and additional forces were required to clear the enemy from the last defensive positions inside the Citadel. Alongside the Marines, ARVN troops and Vietnamese Marines also fought through the Citadel. Yet, almost as this were occurring in an old movie, the last objective would prove the most symbolic—the Old Imperial Palace. On the 21st, Company L, 3-5 Marines was attached to Thompson’s battalion to augment the Vietnamese in taking this final objective. Once more, on the morning of the 22nd, 1-5 Marines launched another attack to seize the south side of the Citadel wall and the gate leading to the southern part of the city. Recalled by Thompson, the attack was a “classic combined arms effort that could not have been done better on a blackboard” (as cited by Shulimson et al., 1997, p. 208). With CAS and M-48 tank fire supporting their advance, 1-5 achieved its objectives by 1800 hours that evening with relatively light casualties, with only three killed and 30 wounded (Shulimson et al., 1997, p. 210).

For political reasons, the *coup d’ grâce* was left to the Vietnamese Marines who made repeated assaults against the Imperial Palace from the 22nd through the 26th eventually eliminating the last pockets of organized enemy resistance. USMC activities after 1-5’s last assault on the 22nd were reduced to continued mopping up operations south of the Song Huong and in and around the Citadel. With the fighting in the city then drawing to a close, U.S. Marines joined U.S. Army forces already operating outside the city in continued operations to clear the area of potential enemy activity.

On 2 March 1968, Operation “Hue City” was officially over. The 26-day battle had been the longest sustained infantry battle to this point in the war. The losses reflected the battle’s duration and intensity. The U.S. Marines casualties totaled 143 killed and approximately 1,100 wounded. U.S. Army losses were 74 dead and 509 wounded. South Vietnamese losses were higher, with 384 killed and 1,773 wounded, and 30 missing (Shulimson et al., 1997, p. 213). The civilians of Hue also suffered dearly during the month-long ordeal, with an estimated 5,800 killed and missing and 116,000 people left homeless (Willbanks, 2003, p. 37). Communist losses were estimated between 2,500 to 5,000 killed, although official Communist reports declared only 1,042 killed, with no record of wounded, prisoners, or missing (Shulimson et al., 1997, p. 213).

Compared to the exchange ratio in the Union operations, the battle for Hue was a much narrower victory in terms of losses when totaling the USMC, U.S. Army, and ARVN casualties compared to those of the Communists, yielded a ratio of almost 1:1. This estimate does not even account for the civilian losses both from executions or combat. One explanation for this could be that the Communists were either unable to withdraw when faced with the superior U.S. firepower or they simply chose not to. One Marine commented that he thought the fighting in the city was easier because, “...you can see more of the damage you’re doing to the enemy because they don’t drag off their dead” (Shulimson et al., 1997, p. 185). For whatever reason, the casualty exchange ratio indicates that the Communists at Hue made the Allies pay for every meter of the city the Allies gained more so than during the Union operations.

Analyses of the battle for Hue often point to three shortcomings on the part of the Americans. First the intelligence failure of anticipating the Tet Offense is considered one of the worst American intelligence failures of the war. Simply put, if the Allies were aware of the offensive, Hue would have been better defended and it may not have required a month of hard fighting to retake the city. Secondly, Marine command and control has been criticized as having failed during the battle. Willbanks (2003) states that no single commander was in charge of the battle and this confused the Allied ability to command and control. This is an excellent point in regard to coordinating the operations of the ARVN forces in the Citadel, the Marines on the south side of the Song Huong, and the U.S. Army’s 1st Cavalry Division efforts to isolate the city to the north.

Isolation of the city was critical and coordination of all three elements in supporting the isolation operation needed to be done. However, given the large linear obstacles that compartmentalized the sections of the city, a single commander coordinating all forces may not have had been effective in the city-specific fighting. Additionally, due to the poor intelligence picture, local commanders were reacting rather than anticipating enemy actions. A single commander may have confused this already complex situation. The third shortcoming often mentioned is the failure of the U.S. Army's 1st Cavalry Division to isolate Hue from the NVA supply centers north of the city until the February 21st. This allowed the NVA to reinforce, refit, and resupply the defenders unhindered for three weeks of fighting.

With these handicaps, the Marine performance at Hue might appear to have been a costly slugging match between the highly trained Americans and the resolute and poorly equipped NVA. This is not the case: The NVA outnumbered the Marines by as much as 5:1 and they were defending from prepared positions (Martin, 2000). Additionally, the Marines were not trained in urban fighting while Hammel states the NVA had received special training in urban fighting prior to launching the offensive (Hammel, 1991, p. 29). So, with an enemy trained in urban combat and planning to stand and fight, how did the outnumbered and ill-trained Marine force *still* manage to win?

The following comparative analysis will demonstrate how different the fighting was for the Marines in the Union operations from what they experienced in Hue. As in the previous cases, this analysis will concentrate on our 5 factors. But here it should be noted that there is at least one significant difference between this case and the previous two. The Marines at Hue succeeded.

D. COMPARATIVE ANALYSIS: UNITED STATES MARINE OFFENSIVE OPERATIONS IN I CORPS SECTOR AND OPERATION "HUE CITY".

1. Environment

a. Physical Terrain

The difference in the physical environment the Marines operated in during the Union operations and the battle for Hue is obvious. The Que Son Basin was a rich agricultural region that mainly produced rice. While the low ground of the basin was cultivated for agriculture, with canals, dikes, and paddies necessary for rice production,

the surrounding rolling hills were thickly vegetated and typical of that region of Vietnam. The cultivated land offered numerous open locations to conduct vertical envelopment operations via helicopter. In contrast, the walls of the basin offered excellent concealment and increased elevation to observe air movement within and entering the basin.

The more densely vegetated areas provided excellent concealment for the defending Communist forces not only from ground observation, but also from the asymmetrical advantages of American air power. The vegetation was thick enough to bog down organized Marine attacks at the company and battalion levels, which allowed the Communists to continue to play the “cat and mouse game” and evade the pursuing Americans (Telfer et al., 1984, p. 52). The Communists skillfully combined their defenses on key high ground while dominating the numerous open avenues of approach in the cultivated rice paddies below. Terrain in the Que Son Basin favored the Communist defenders. Even though the Union operations were American offensive operations, the Communist offensive infiltrations into the basin were designed to draw the Americans into direct combat where the Communists could enjoy their established defenses.

In contrast to the rugged terrain of the Que Son Basin, Hue had its own unique features that made it a “defender’s paradise” (Willbanks, 2003, p. 32). Like many other cities around the world, Hue is divided by a river. The historical center, the Citadel, was to the north of the Song Huong (Perfume River) while the more modern sections with industry and government infrastructure were to the south. Additionally, the tributaries of the Song Huong made Hue a series of islands that were only accessible by key bridges or shallow draft watercraft. This aspect of the city offered a defender an additional advantage granted he could dominate these isolated and vulnerable avenues of approach (Hammel, 1991, p. 30).

The southern section of the city, consisting of more modern structures, was not as congested as the Citadel. The buildings resembled those of any contemporary western city with various parks and open areas. The government infrastructure centers were generally larger multi-story buildings that covered entire blocks as opposed to the

smaller, older structures of the Citadel. Government centers common to all large cities, such as the “Treasury”, “Hospital” and “Provincial Headquarters,” would take on new meanings for the Marines as areas that offered stiff resistance during the fighting. The southern section of the city became a laboratory for two Marine infantry battalions to learn the lessons of urban warfare. In the southern section of the city, Lieutenant Colonel Gravel and his under-strength battalion were able to advance “only 75 yards...the going was slow. We would go maybe a block. We fought for two days over one building” (as cited by Shulimson et al., 1997, p. 189).

The Citadel itself was a city within a city, with 30-foot high and 40-foot thick walls that surrounded the historic center in the shape of a square, approximately 2700 yards long on each side (Willbanks, 2003, p. 4). Major Thompson described the Citadel as “row after row of single story, thick walled masonry house jammed close together and occasionally separated by alley ways or narrow streets” (as cited by Shulimson et al., 1997, p. 201). Additionally,

...nearly all the buildings inside the Citadel and in the modern city were of stout concrete or masonry construction. Each building was a potential pillbox or bunker that could be fortified to withstand a direct assault by even the most heavily equipped modern infantry. (Hammel, 1991, p. 30)

In addition to the tight irregular streets common to an 18th century city, the Imperial Palace in the Citadel in itself comprised a smaller walled Citadel that dominated all approaches through the old city.

b. Human Environment

Beyond the obvious differences in the physical terrain where operations were conducted, the people that lived in the Que Son Basin and Hue represented another distinct part of the landscape that affected Marine operations. First, the Que Son Basin had been under Viet Cong control for over 20 years. With increased Marine activity and establishment of the Nui Loc Son base, Viet Cong sympathizers or active insurgents were able to easily report on the activity of the Americans. With the infiltration of two NVA regiments into the area in April 1968, the importance of reports tracking American activities naturally increased. Since both sides were looking to engage in direct combat,

the advantage of actionable intelligence favored the Communists. The ability to collect and disseminate this intelligence was easier for the Communists with the hold they had over the population, through either their supporters or people coerced by the Viet Cong.

At the same time, Hue was an international city, with over two hundred years of European cultural influence. Since Hue was the provincial capital of Thua Thien and the fourth-largest city in the Republic of Vietnam, the population naturally had strong governmental, political, and economic ties to the south. This was seen during the round-ups and subsequent murder of approximately 3,000 Vietnamese and foreigners on the 31st. Additionally, the fighting that raged from 31 January through 2 March caused thousands of Hue residents to flee the city, even as American and ARVN forces did their best to safeguard the civilian population. Given the remote, rural location of many of the engagements in the Union operations, protecting civilians did not present the same degree of difficulty.

More than any other factor we discuss for this case, the environment, with its physical and human dimensions, led to significant changes in Marine tactics. Up until the battle of Hue, most combat in Vietnam was conducted in rural settings. Training, organization, and equipment were all designed to support operations like those undertaken in the Union series. The Marines found themselves having to make numerous adjustments to their tactics, techniques, and procedures in Hue to seize their objectives. As the combat-experienced commander of H/2-5 Marines, Captain Ron Christmas put it:

I could feel a knot developing in my stomach. Not so much from fear—though a helluva lot of fear was there—but because we were new to this type of situation. We were accustomed to jungles and open rice fields, and now we would be fighting in a city, like it was Europe in World War II. (as cited by Willbanks, 2003, p. 25)

First Lieutenant Lambert, also of H/2-5, further reflected, “urban warfare is very different from jungle warfare because you never know where they [the enemy] are going to be” (Martin, 2000). Veterans of C/1-5 Marines further confirmed this when they stated in an urban operations compendium published by RAND, *Ready for Armageddon* (Nelson, et al., 2002), that prior to the Tet Offensive, “Marine forces were literally knee-deep in rice paddies and jungle mud...” (Nelson, et al., p. 98).

Given the vast differences between the environments where these different operations occurred, each of the additional factors discussed can be linked back to the all-encompassing factor *of* environment. With these major differences taken into account, the common thread of how the Marines operated can be drawn back to their relative comfort in the rural environment and their inexperience in the unfamiliar and brutal environment of a large, old, and congested city.

2. Time

Typical of NVA methods, infiltration into an area of operation was followed by building defensive positions and resupplying those positions to aid NVA control of a region and population. Operations in Que Son Basin and Hue were the same in that regard. In both cases, the enemy moved in, established defenses, and began to impress, indoctrinate, and exploit the local populations. Since the Communists used such techniques to conduct their guerilla war, the onus of removing them fell on the Allies. To use Brigadier General Avidor's framework of analysis, the Communists understood the concept of relative time. They were able to execute the offensive campaigns because their idea of victory was not tied to a timeline with specific time-oriented goals. They were able to force the Allies to react to their timetable of offensive action and then simply withdraw at their choosing, particularly once the Allies were able to bring overwhelming force to bear on their well-prepared defensive positions. One NVA author described how their enemy did not understand their intent. "The enemy knew nothing of our strategy; by the time our forces approached the city of Hue, the enemy still had not taken any specific measures" (as cited by Shulimson et al., 1997, p. 214).

a. Relative Time

During both Union operations, the Marines were "force oriented" in the sense that they were not constrained by time to destroy the enemy. Even though the Marines would not be able to search indefinitely for the NVA, their timeline for the missions was driven by enemy contact rather than seizure of specific terrain as at Hue. The Marines knew they were going into an area that had been controlled by the Viet Cong for the past 20 years. They understood that an overnight success would not alleviate the hold the Communists had on the region. To break the Communist hold, the Marine company at the Nui Loc Son base began to conduct civic action projects to sway

popular favor towards the Allies. This, coupled with the deliberate preparations Colonel Radic made to counter any large-scale operations of the 2nd NVA Division, shows the Marines were not time dependent in their planning and execution of Operation Union. In the long run, if NVA elements were destroyed and the basin was made secure to reduce communist influence, the mission was successful. In essence, the Marines took an approach to operations similar to that of the communists—they were waiting for their opponent to react to their move.

On the other hand, at Hue, the operations were politically charged as soon as Communists occupied the city. Each day the Communists controlled the city suggested that the NVA forces were liberating the most venerated city in Vietnam. Given such symbolism, it is no wonder that Vice President Ky was willing to “accept responsibility” for damage done to the Citadel to remove the Communists (Shulimson et al., 1997, p. 205). The commander of 1-5 Marines, Major Thompson, later commented on the issue of time that, “We were 12 days late and Lyndon Johnson was very adamant about getting it over with” (Martin, 2000). With this kind of pressure to produce results quickly, the Marines were forced to approach relative time much differently than in the typical search and destroy operation, in which the senior tactical commanders could decide the tempo of the battle. At Hue, pressure from above often *shoved* the Marines forward before they were ready.

Early in the battle, orders from Brigadier General LaHue to Batcheller’s company, and later to Gravel’s makeshift battalion, were indicative of the Marine leadership being totally unprepared for the Tet Offensive attacks on Hue. These orders show a lack of understanding of how much time was required to fight in a city regardless of the anticipated size of the enemy force. On 31 January, LaHue ordered Lieutenant Colonel Gravel on missions that were unachievable. Both the drive to the MACV compound and the movement across the Nguyen Hoang Bridge were assaults made on time-driven directives from higher commands. The extensive functional time required for fighting in the urban environment was not realized until casualties were mounting without gains made against the defending NVA. Here the relative time need of a quick decision dictated the functional time the higher echelon leadership would allow.

b. Functional Time

On the tactical level, functional time was a critical piece for the Marine operations in the Que Son Basin. In both Operation Union and Union II, relief forces were rapidly shuttled into the battles to affect a shift in the fight. During the action on 30 May 1967, Colonel Houghton needed to request the release of the 1st Marine Division reserve when two of his battalions were pinned down by an enemy strongpoint defense. Even with the two battalions pinned down, Colonel Houghton could estimate how much time it would take to move the reserve into place. Although the situation was desperate for the battalions in contact, he knew he could wait for the arrival of the reserve. Had Colonel Houghton been ignorant of the time required to commit the division reserve, he could have withdrawn his forces prematurely, possibly inflicting more casualties.

Early in the battle on the unfamiliar terrain of Hue, the Marine leadership did not understand the concept of functional time in a city fight. The Marines recognized after the first two days of fighting that achieving their designated objectives would take longer than expected. In fact, Lieutenant Colonel Gravel was initially criticized for his slow progress on the southern side of the Song Huong until Lieutenant Colonel Cheatham's 2-5 Marines experienced the same problems. (Shulimson et al., 1997, p. 180). To their credit, the Marines learned quickly not to push for success in seizing objectives. Captain Dale Dye (retired), one of the authors of the *Ready for Armageddon* study (Nelson et al., 2002), describes his view of functional time in terms of operational tempo:

Slow the tempo. Finally one of our most valuable lessons fighting on the south and north sides of Hue was to slow down and be deliberate. Before we got the feel for urban ops we had the tendency to just go hey-diddle-diddle right up the middle and rely on the momentum of our attack to shock the enemy. He was not easily shocked as we learned to our detriment. The solution was to slow down, assess the situation, make a deliberate plan, and carry it out with vigor! (Nelson et al., 2002, p. 107)

This example illustrates how a unit comfortable operating at one speed (probably reacting to enemy fire in a rural setting) needed to take into account the city

environment prior to attempting to accomplish tasks such as seizing and clearing buildings. Basically, the Marines did not apply Avidor's idea of functional time to the urban environment until the second or third day of heavy fighting and losses.

Once the Marines established how much time it would take to work through the city, they moved more methodically with detailed planning as Dye mentions. Key to their success in relation to time was that they did not allow themselves to be shaken in their planning and execution. This was evident in their deliberate approach to seize limited objectives day by day, as opposed to their initial unsuccessful forays to push the decision by seizing key locations in the city. Their operations after the 4th of February moved much more smoothly, with greater success even though the casualty rates were still high.

c. Objective Time

The majority of movements and fighting during the Union operations were conducted during daytime. This is logical given the mission of actively seeking out enemy positions in order to maneuver on and destroy them. Additionally, the complexity of multiple battalions moving in concert, methodically sweeping through jungle, was more easily controlled during the day. This did not mean that the movement and fighting stopped at sundown. In both Union I and II, the Marines continued to press NVA positions in the dark. Often, the NVA would smartly withdraw under the cover of darkness to avoid the fire superiority the Americans had. This proficiency in operating in the jungle at night would not carry over to Marine actions at Hue.

During the city fight, the Marines did not continue offensive operations after sundown. There are two possible explanations for this. First, the complexity of the environment with the extensive amount of obstacles and ambush positions would only favor the static defender more. Secondly, the risk of coordinating attacks in the dark quagmire of rumpled concrete and broken glass would only add to the casualties from debris as well as fratricide. As First Lieutenant Lambert of H/2-5 stated, "We spent the night where ever we stopped fighting for the day...we held the ground we conquered that day" (Martin, 2000). A Marine in 1-5 Marines fighting in the Citadel confirmed this with an eerie twist: he would awake each morning to the M-48 tanks starting their engines and with that he knew he had another day of fighting house to house (Martin, 2000).

It seems from these accounts the American were satisfied to hold what they could control each night. The Communists, however, used the darkness to reinforce, resupply, and refit as well as displace to a more defensible position, usually two blocks away from the Americans in their nightly defensive perimeters. They also conducted limited probes and harassment fire to most likely hide such activities.

3. Informational Factor

The main difference in the informational aspect of these two types of operations lies in the deliberate planning and execution involved. Both Union I and II were deliberate operations designed to make contact with and destroy Communist forces operating in the Que Son Basin. Intelligence preparation and planning were obviously successful, given the ability of the Marines to search, locate, and dislodge NVA positions. As the situation developed, forces in both Union operations maneuvered onto the enemy positions as necessary to destroy them. Fire support and CAS were also a standard part of these multiple battalion operations and were included in the planning.

Since search and destroy operations were based on imperfect information about the enemy, the engagements during both Union operations required a combination of immediate action fire and maneuver drills, followed by deliberate development of the situation, with the commander maneuvering forces to defeat the enemy. Even with the difficulty of seeing friendly units, most Marine leaders from the regimental commander down to the fire team leader knew where the enemy and friendly units were located in the rugged terrain of the Que Son Basin. The one exception to this was during the Union engagement on 10 May when a Marine air controller mistakenly directed close air support onto a friendly company, halting its supporting attack. During the two Union operations, this was the only significant case of fratricide. Given that friendly forces were converging from three sides onto the enemy strongpoint, it is surprising other units were not targeted as well during the close quarters fighting. This success can be credited to experienced leaders having the situational awareness to maintain unit locations in the heat of battle.

In contrast, the Marines operated in an information vacuum at Hue. They entered the battle, reacting to the Communist offensive without deliberate planning to support their actions. Captain Batcheller's Marines in Company A/1-1 were completely

unprepared for what awaited them at Hue, not just in terms of the tactics, techniques, and procedures needed for urban combat, but about the enemy situation in general. Had there been any understanding of the Communist forces present at Hue on the 31st, one can assume more deliberate plans to relieve the MACV garrison would have been made, similar to the planning that was later done to storm the Citadel.

Additionally, both the 1st ARVN headquarters and the MACV compound can be blamed for the poor situational picture. On the one hand, this might be considered understandable given that both compounds were under siege and lacked a clear picture of the enemy's activity or overall intent. Several first-hand quotes attest to the fact the Marines were going into the city blind. On the morning of 31 January, Lieutenant Colonel Gravel was unprepared to move from Phu Bai in support of A/1-1. According to his account, the only planning he had time to conduct was to issue the command, "Get on the trucks, men" (as cited by Shulimson et al., 1997, p. 172). Expecting only a two-hour engagement, Gravel's men did not take adequate supplies or personal gear, less "rain gear," for what would be a month of intense combat (Hammel, 1991, p. 69).

Lieutenant Colonel Cheatham's entry into the battle was similar, with the broad yet curt directions from Colonel Hughes, "I want you to...attack through the city and clean the NVA out...if you are looking for any more, you aren't going to get it. Move out!" (as cited by Shulimson et al., 1997, p. 180). Even two weeks later, as Major Thompson, the battalion commander of 1-5 Marines, was receiving his orders, he was under the impression that "no one seemed to know what the actual situation was in the Citadel. I can remember General LaHue commenting it shouldn't take more than a few days to clear up the Citadel affair" (as cited by Shulimson et al., 1997, p. 198). Given the difficulty of fighting in this complex environment, this lack of information did not help the Marines in their planning or execution—whether we are analyzing Day One or Day Fourteen in the battle. The most basic information was not coming out of the city. Several veterans of C/1-5, commenting on their participation in the battle, questioned why the ARVN forces had not sent a report to the Americans on the disposition of the enemy in the Citadel since they had been fighting there for two solid weeks (Nelson et al., 2002, p. 100).

Historically, the Allied inability to foresee the Tet Offensive is considered one of the war's most significant intelligence disasters.¹⁹ This failure to forecast the impending offensive included oversights in the estimates regarding operations against Hue itself. The Allies did not foresee that the Communist plan was to move into a major city in force and attempt to hold it and inflict significant casualties on their opponent in the process. Brigadier General Graham, the 1st Marine Division Operations Officer, commented on the intelligence estimate prior to the 31 January attack, "Hue had no military value to the NVA/VC. Da Nang was the prize—for success in that endeavor could have had serious effects on the Allied efforts in the III MAF area" (as cited by Shulimson et al., 1997, p. 163). On the morning of 1 February, Brigadier General LaHue made the following statement to a group of American reporters at Phu Bai, "Very definitely we control the south side of the city...I don't think [the Communist forces] have any resupply capability, and once they use up what they brought in, they're finished" (as cited by Shulimson et al., 1997, p. 175). This statement was made with the Marines barely in control of the MACV compound, less the entire southern side of the city.

Additionally, unfamiliarity with the time and assets that were required to clear the NVA out of the city were apparent. LaHue was consistently making incorrect estimates about the assets and effort needed to fight in Hue. As discussed earlier, the initial relief efforts were expected to be over in a day. Later that same day, Gravel's force, expecting heavy resistance, still planned to be back by dusk that same day (Hammel, 1991, p. 69).

At the tactical level, Marine command and control was skewed early on in Hue. The physical environment made it difficult to control forces. Unlike rural environments, where commanders could see their forces or conceptually picture the piece of terrain they occupied, the numerous unfamiliar buildings forced the Marines to adapt in order to maintain control. Captain Meadows, the commander of G/2-5 Marines noted, "...you

¹⁹ Shulimson et al. quoted General Westmorland on his thoughts of the intelligence picture prior to Tet. "Intelligence is an imprecise science: it is not like counting beans; it is more like estimating cockroaches..." (as cited by Shulimson et al., 1997, p. 10). Shulimson et al. further relay that U.S. intelligence believed Hue was a major enemy objective, but the 1st ARVN Division could not "credit the enemy with 'the intent' nor 'the capability' to launch a division-size attack against a city" (Shulimson et al., 1997, p. 17).

have to raid the local Texaco station to get your street map. That's really what you need" (as cited by Shulimson et al., 1997, p. 185). Prior to the use of street maps with numbered checkpoints to identify key structure, colors were used to delineate sectors,

Captain Christmas later related some of the resulting confusion. He would radio Captain Downs and yell, "Hey, I'm in a pink building." Downs would reply, "Hey that's fine. I'm over here in the green building." Then Captain Meadows would chime in with "Good! I'm in a brown building." At this point Lieutenant Colonel Cheatham would come up on the network and ask, "Where the hell are the green, brown, and pink buildings?" (Shulimson et al., 1997, p. 185)

Even with this confusion, the Marines can credit only their tenacity and innovation with being able to walk into a completely foreign environment and in a matter of days begin to make forward progress in clearing the city.

As mentioned earlier in the analysis of the environment, the human landscape of the city could have been better used. We found no specific evidence of civilians from Hue openly assisting the Marines or ARVN forces with information as they advanced through the city.²⁰ It would be simplistic to say the use of civilians would have enhanced the intelligence collection capabilities of the Allies. Yet, getting people to gather the information that can be used for military intelligence purposes is a more difficult undertaking. The fighting was not isolated to a specific section or conducted through surgical raids. The fighting was non-stop. Whereas the offensive efforts tended to be conducted during daylight by the Marines, operations did not stop, day or night. With this level of intensity, civilians moving through the city doing anything besides fleeing (e.g. attempting to collect information) would appear as out of place as the large-framed Caucasians were prior to fighting beginning in the city. Additionally, the Communists had already begun to round up civilians they wanted to detain. Anyone who learned of the fate of the 3,000 detainees would most likely have been reluctant to assist. The intensity of the combat transformed the human landscape of Hue from civilian to combatant-dominated.

²⁰ There is one case documented by Shulimson et al., of a Vietnamese family hiding a Marine who became separated from his element during the fighting (p. 223).

4. Use of Technology

The difference in the settings between the Union operations and the battle for Hue affected the uses to which available technology was put. The equipment and weapons common to all Marine infantry battalions were used similarly. At the same time, equipment not organic to the infantry battalions was employed to support operations in both environments, but was utilized differently in both instances.

During the Union operations, the Marines were restricted to what they could carry on their backs and what would fit into the CH-43 and CH-46 helicopters that moved the forces into the Que Son Basin. In contrast, Marines moved into Hue in trucks and tanks. Consequently, only their own miscalculations and ill preparedness in obtaining equipment at their base camps restricted their equipment loads.

a. Armaments

Despite the environment, mission, or requirements to ‘move light,’ a Marine infantry battalion did not move without its organic 81mm mortars. These indirect weapon systems proved invaluable in providing immediate fire support to Marines in contact with the NVA. During engagements in both Union operations, accurate mortar fire was at times the only available fire support to relieve pressure on pinned down Marines.

In both Union operations, artillery and close air support were the additional critical tools the commander could call for. Various types of fire support were instrumental in reducing enemy positions, as well as in supporting Marine attacks. Marines during the Union operations were able to move artillery by air, within the Que Son Basin to support the operations. Even though they had to reposition the artillery by helicopter, fire missions were beneficial in efforts to break enemy defensive positions and exploit opportunities to destroy forces withdrawing.

In contrast, tracked vehicles capable of supporting infantry operations were more of a hindrance than help during rural operations. Normally they were not useful in rural areas even where there were road networks that could support their movement. In the typical restrictive terrain in regions such as the Que Son Basin,

Tracked vehicles became more of a liability than a tactical asset. They were restricted to the road because the thick brush provided excellent cover for NVA soldiers armed with antitank weapons. Instead of providing support to the infantry Marines, the tracked vehicles required infantry protection.” (Telfer et al., 1984, p. 127)

In Hue, the various types of fire support were employed differently. At first, no fire support was made available due to restrictive rules of engagement (ROE) placed on the Marines.²¹ As the battle lingered, with mounting casualties, the Allied commanders relaxed these rules. Even with fire support available, its use in support of operations in the city did not have the same effects as in rural areas. As Lieutenant Colonel Gravel commented, “...artillery in an area like that is not terribly effective because you can’t observe it well enough. You lose the rounds in the buildings, in the streets...and you have a difficult time with perspective” (as cited by Shulimson et al., 1997, p. 186). Colonel Hughes further commented that the heavier rounds, such as the 155mm and eight-inch howitzers, were accurate enough to walk down streets in a rolling barrage to dislodge troops. Yet, in support of clearing buildings, Lieutenant Colonel Cheatham commented that, “...if you put enough 81 rounds on top of a building, pretty soon the roof falls in”(as cited by Shulimson et al., 1997, p. 188). Additionally, he said, “As wonderful as our artillerymen are, I wasn’t going to have them fire from 11 miles away [Phu Bai] and fire into a building across the street from me. That’s just impossible” (Martin, 2000). So, here, the lighter, more surgical use of the organic mortars appeared the best artillery solution for supporting the close quarters combat.

Even more surgical than the organic mortars, was the use of the 106mm recoilless rifles. This 450-pound (not including ammunition) crew-served anti-tank weapon was difficult to move in the city and caused a great deal of destruction if fired from within positions with cover. Yet, the recoilless rifle could accurately create a four square meter hole or knock down entire sections of walls in most masonry structures up to 300 meters. This was valuable in attempts to breach the city structures and shock any defenders inside. Additionally, the concussion of a firing recoilless rifle along with its back blast, provided enough of a distraction and dust that it served as an impromptu

²¹ The ROE will be discussed in detail during the Doctrine and Decision-Making portion of the analysis.

smoke screen to cover the movement of Marines across streets. (Martin, 2000). According to Colonel Hughes, “If any single supporting arm is to be considered more effective than all the others, it must be the 106mm recoilless rifle, especially the M-50 Ontos...” (as cited by Shulimson et al., 1997, p. 186).

The Ontos²² was a light tracked vehicle designed as an Army reconnaissance vehicle in the early 1950s. The Marines adopted the failed Army design as a recoilless rifle carrier in their anti-tank battalions. In Hue, the M-50 was mounted with six 106mm recoilless rifles. Because of the small size of the vehicle, the crew had to dismount the vehicle to load the rounds. Even so, the Ontos was very capable in the city given its small size and ability to move quickly, fire, and withdraw before it could be engaged. The firepower was devastating thanks to the crew’s ability to fire the recoilless rifles individually, in pairs, or all six at once (Brush, 2002). Lieutenant Colonel Cheatham further points out that the vehicle was “as big a help as any item of gear that we had that was not organic to the battalion...” (as cited by Shulimson et al., 1997, p. 186).

In addition to the diminutive Ontos with its powerful punch, the Marines eagerly employed other heavy weapons platforms that added firepower and armored protection. Two other platforms used extensively in Hue were the M-48 Patton tank and M-42 Duster anti-aircraft vehicle. The M-48 was an aging main battle tank with a 90mm main gun and supporting machine guns. These tanks supported operations in a manner similar to that of the recoilless rifles, but were able to withstand more small arms and rocket fire. However, the tanks were “rocket magnets” and drew a high volume of fire from the enemy (Nelson et al., 2002, p. 108). As Lieutenant Colonel Cheatham explained, “You couldn’t put a section of tanks down on those streets. The moment a tank stuck its nose around the corner of a building, it looked like the Fourth of July” (as cited by Shulimson et al., 1997, p. 186). “Killer teams,” comprised of one M-48 and one M-50, allowed for effective maneuverability and protection for the two platforms while still applying surgical firepower. The pairing at first seems illogical. But, since the Ontos was lightly armored, the best way to bring its devastating firepower to bear was to

²² Ontos is the Greek word for “Thing” (Brush, 2002).

pair it with a better-protected M-48 that could suppress enemy fire while the Ontos fired. Such ad hoc combinations were common for the Marines and clearly demonstrated their ability to construct organizations of convenience in order to accomplish missions.

In contrast, the Duster had two 40mm cannons capable of firing 60 rounds per minute. Dusters were normally employed in convoy support or in support of static defensive positions, such as during the siege of Khe Sanh. Because of its open turret and exposed crew, the use of the vehicle in street fighting was extremely dangerous. Even in the urban environment, these vehicles were limited to support by fire roles at distances where they could not be affected by enemy fire, such as during Lieutenant Colonel Gravel's initial assault on the Citadel on the afternoon of January 31. Nevertheless, and despite their vulnerability, the additional firepower these platforms offered was appreciated through much of the battle, since the environment was not conducive to traditional fire support, or the ROE would not allow it. In the case of the fighting in Hue, the established road networks actually aided the Marines to bring these larger weapons systems to bear.

b. Added Punches

An addition to the arsenal that Lieutenant Colonel Cheatham brought to the fight were the 3.5-inch rockets, the M20. These rockets were affectionately known in WWII as "bazookas," and were able to do more damage in built-up areas than the current 66mm disposable rocket, the M72 Light Antitank Assault Weapon (LAAW). M72s were standard issue for infantry units in Vietnam and proved extremely useful in the numerous rural "search and destroy" missions as immediate shock-producing flat trajectory rockets. Cheatham recognized the M20's effectiveness and tasked Major Salvati, his battalion executive officer, to find as many as possible for the impending fight in Hue (Hammel, 1991, p. 135). M20s achieved the desired effects by creating man-sized holes that aided in breaching and clearing buildings.

A key non-lethal weapon that was used to great effect in both rural and urban fighting was tear gas. Even though tear gas was not used during the Union operations, it was used defensively in September 1967 in the Que Son Basin during Operation Swift. In one case, an isolated platoon of M/3-5 Marines was attempting to disengage. The platoon commander requested an airdrop of tear gas to allow the Marines

to withdraw. The gas was effective in disrupting the enemy, but its use proved to be a double-edged sword. The Marines were able to withdraw, but were also affected by the gas as they had discarded their masks during the action (Telfer et al., 1984, p. 113).

During the fighting in Hue, the use of tear gas started with 2-5 Marines' assaults on the "Treasury." The battle executive officer, Major Salvati, located some tear gas canister launchers in the MACV compound and used them to support an impending assault. The gas worked as the NVA was unprepared for the gas. The veterans of C/1-5 Marines commented that in about two weeks (13-24 February) of heavy fighting to clear the Citadel, their battalion suffered approximately 50% casualties to seize 16 city blocks. On the 25th of February, with the use of tear gas, the 1-5 Marines cleared another 12 blocks without a single casualty (Nelson et al., 2002, p. 109). In both environments, the gas produced the desired effect of disrupting the enemy. The difference was that in the non-urban environment it was used defensively to assist a break in contact while in Hue it was instrumental to "smoke out" the enemy from the confined spaces of the city buildings.

5. Human Factors

a. Limits of the Human System

As in any environment, combat is physically grueling. The Union operations and the fighting in Hue were no exception. Both Union operations involved more than one engagement. They were lengthy "search and destroy" operations to destroy enemy forces. Forces were thus in the bush for a few weeks at a time, attempting to make contact with the enemy. Even though forces were seldom in direct contact with the enemy, both Union operations had included periods of two to three days of continuous contact with the enemy.

Additionally, the longer, pitched battles between advancing Marines on entrenched NVA positions (e.g., the actions on 26 April and 30 May) lasted for hours during the day with sporadic fighting continuing into the night. While there is evidence of leaders pushing their men forward, there does not seem to be evidence that the forces were suffering combat fatigue by the time they completed the operations.

During Hue, the environment seemed to affect the endurance of the Marines differently. The battalion acting as the main effort of the attack shifted three times during the battle. On the 31st, Gravel's 1-1 Marines were unable to achieve any progress beyond securing the MACV compound. Cheatham's 2-5 Marines took over the role of main effort only three days later, on the February 3rd, and continued to serve in that role through the major fighting on the southern side of the city until 10 February. Thompson's 1-5 Marines served as the Marine main effort once the need for American reinforcements shifted to the Citadel. Their fight lasted 12 days, from 13 to 25 February.

The duration and intensity of the actual fighting also seemed to have an effect on the limits the human system could withstand. Private First Class Purcell recalls the differences:

This probably was some of the most vicious fighting any of us had seen at that point in time. Normally, you would be in a pretty good firefight it may last an hour, it may last five minutes, it may last half a day, but then you were out of it. Here it just didn't stop. That was the amazing part. It just did not stop. (Martin, 2000)

Since the fighting was non-stop and the Marines were often intermixed with the NVA, the increased stress was bound to cause fatigue. Hammel gives us a flavor of this in his description of Lance Corporal Towe. Tossing grenades and quickly rushing into "the smoke filled rooms to spray the interior was proving to be extremely nerve-racking even after a day in which no enemy soldiers had been encountered" (Hammel, 1991, p. 116). Captain Harrington of D/1-5 remarked:

The intensity of the fire was incredible. You can't believe how loud it was. When you have all these weapons going off and the reverberation of the sound off of the concrete buildings and off the wall [Citadel wall], it was almost unbearable. (Martin, 2000)

John Laurence, a CBS correspondent at Hue observed:

They had just seen too much. Too many of their friends being killed, too much violence, too much noise, too much fear. Their brains had shut down. (Martin, 2000)

Additionally, the horrors of combat seemed to be magnified in the city. Captain Harrington observed, on his entry into the Citadel, "When you looked around, it

was utter devastation. There were buildings down, vehicles burning, and bodies thrown about. The stench of death was all around you. I mean the smell was just horrendous” (Martin, 2000). Another Marine confirmed this, “...the stink—you had to load up so many wounded, the blood would dry on your hands. In two or three days you would smell like death itself” (Shulimson et al., 1997, p. 191). In another example, Colonel Hughes, the 1st Marine Regiment commander, ordered the shooting of all dogs and cats in the city. The animals were feeding on the dead that were not yet recovered. Naturally, the killing of the dogs and cats only added to the masses of decaying flesh that were piling up in the streets (Shulimson et al., 1997, p. 221).

b. Will and Morale

Whether the Marines in action during the Union operations were shaken or even broken cannot be determined. Even with first hand accounts this is a difficult factor to analyze. However, what we do know is that Marine companies in most cases moved aggressively forward to engage the enemy, often through thick vegetation where the enemy could not be pinpointed. In one case of conspicuous gallantry and exceptional small unit combat leadership, Marine Captain James A. Graham posthumously earned the Medal of Honor for his actions at the rice paddy during the 2 June engagement of Union II.²³

Where there is no clear evidence by which we can measure the strain on will and morale during the Union operations and how they affected the outcome of the operations, the following illustrates the fighting will and morale of a Marine (or common foot soldier).²⁴

Then-n-n, you run into somebody that you start firing at, and you say,
“Well I’m going to kick his fucking little fucking Gook ass.” And all of a sudden this motherfucker got you pinned down. Y’know, I mean he’s

²³ In an effort to relieve one of his platoons, Graham hastily organized an assault that successfully destroyed an enemy machine gun position. In the confusion of the action, his assault group was cut off from the rest of the company. Unable to remove one of his wounded Marines, Graham stayed with him and defended him with his life. The rest of the assault group was able to make its way back to friendly lines and rejoin its company that had also been able to break contact because of Graham’s efforts (Telfer et al., 1984, p. 304).

²⁴ Jonathan Shay, in his book *Achilles in Vietnam: Combat Trauma and the Undoing of Character* (1994), addresses combat trauma of Vietnam Veterans. The service of the foot soldier in this case is unknown. Since all of Shay’s examples are taken from his combat trauma patients, their identities are omitted. In a later quote, a serviceman states he was in Union II. Since this was an all-Marine operation, it seems safe to assume he is a former Marine.

tearing up the fucking trees you're hiding behind. And you start saying to yourself, "These motherfuckers are serious. Well, what they're doing. Y'know, "I'm going to break his fucking balls when I get ahold of him." Well I mean, you're scared at the same time, but your adrenaline and the training makes you fucking mad, now. "I'm going to kick his little motherfucking ass when I get my hands on him." (as cited by Shay, 1994, pp. 105-106)

In contrast, the battle for Hue offers more detailed examples that illustrate the challenges of urban combat and demonstrate the need for solid unit will and morale under the tremendous strain of fighting there. For instance, during the first day of fighting, on January 31, one of the MACV advisors, Major Frank Breth, who had commanded a Marine infantry company prior in combat, commented that he had never seen troops [A/1-1] so "jumpy," and that they needed to pull themselves together in order to get back into the fight (Hammel, 1991, pp. 74-75). Just a few days later, a veteran of two weeks of bush fighting was found lying on a bed, "hallucinating, whimpering, and talking to himself until members of his squad tied him down and one of the docs dosed him with morphine" (Hammel, 1991, p. 128). Even though the other Marines openly cursed him for his cowardice, many wondered who would be next. The canalization of the urban terrain naturally was a concern for the Marines, as First Lieutenant Lambert remembered:

It was hard to motivate the men to run into a storm of fire much like the soldiers that came out of those landing craft at Normandy. But, the morale and the aggressiveness if you could keep it built up in your platoon, those Marines would do that. (Martin, 2000)

Another Marine rifleman recounted, "I think the thing that really bothers me the most is just seeing Marines laying lifeless in the streets. It wasn't a matter of if you were going to die daily, it was a matter of when" (Martin, 2000). Even on the final assault to secure the Palace wall, this same Marine commented, "This is it. This is the morning I'll get it. Because, you know I'm gonna run out of luck (Martin, 2000).

This type of hesitation was not restricted to the junior Marines who often only needed a strong push to get them started again. On 20 February, during a battalion command conference, Major Thompson had decided, "to continue as before [an attack on the Citadel's west wall] would be sheer folly." He, instead, suggested a night attack.

Thompson noted that most of his company commanders “were not very enthusiastic...they were willing to try, but I could see that their hearts were not in it” (Shulimson et al., 1997, p. 207). With the will of his senior leaders beginning to bend seven days into the fight, Thompson was lucky to have kept his Company A in reserve to lead the assault.

Will and morale were tested in a variety of ways in Hue. There were also plenty of heroics by Marines. Serving as a platoon commander, 21-year-old Sergeant Alfred Gonzalez earned the Medal of Honor for his actions on January 31st as a member of A/1-1 Marines. He was later killed on 3 February leading his platoon in seizing the school building. Other actions, such as that of Lance Corporal Lester A. Tully, were equally common. During 1-1 Marines’ advance across the Song Huong on the 31st, Tully initiated the assault to cross the Nguyen Hoang Bridge to get beyond the intense enemy fire. His actions allowed two platoons to move forward to the relative safety of the north side of the river (Shulimson et al., 1997, p. 174). Most telling though, Lieutenant Colonel Cheatham described the overarching spirit of his men:

I don’t ever remember seeing people with that kind of commitment sometimes being wounded once or twice and some three times and still not leave. Or, when they are evacuated, then find them sneaking back because they aren’t going to leave their platoon or their squad. (Martin, 2000)

At Hue, as in other cities, the fighting was continuous and in close proximity to the enemy. Captain Dale Dye even recommended fixing bayonets to aid in clearing rooms. Often Marines were in “eyeball-to-eyeball meeting engagements” (Nelson et al., 2002, p. 107). Fighting in such a complex environment, where the ability to disengage at one’s choosing is not available, will eventually wear anyone down. While it cannot be proven that the fighting was tougher in Hue compared to the countless engagements that occurred in the jungle, the testament of the Marines who fought in both environments show that without cohesive units with strong will and morale, this battle would have gone worse for the Marines.

c. Ethics and Morality

Marines do not appear to have engaged in any improper conduct during the Union operations at the unit level. However, individuals did stray beyond the control of their leaders. Jonathan Shay quotes one veteran on his loss of control specifically during Union II:

It was a week or two into Union II. I was walking point. I had seen this NVA soldier at a distance...We spread out to look for him...I couldn't tell who it was, us or him...I saw he had one of those commando weapons...and he brought it up and I was looking straight down the bore. I PULLED MY TRIGGER ON MY M-16 AND NOTHING HAPPENED. He fired and I felt this burning on my cheek. I don't know what I did with the bolt of the 16, but I got it to fire and I emptied everything I had into him...I just went crazy...I pulled him out into the paddy and carved him up with my knife. When I was done with him he looked like a rag doll that a dog had been playing with. Even then I wasn't satisfied...I felt a drastic change after that. I just couldn't get enough...the hate'd build up, ESPECIALLY SEEING WHAT THEY DID TO OUR GUYS IN THE OUTFIT THEY GOT A HOLD OF—CUT OF THEIR DICKS, CUT OFF THEIR EARS...Got worse as time went by. I really loved fucking killing couldn't get enough..." (as cited by Shay, 1994, p. 78)

Even though this loss of moral control is linked to a single incident, for this Marine it changed him permanently. This Marine also alludes to the fact this became the norm for him in combat. Shay refers to this behavior as the "berserker state" and also states that this conduct to a degree was acceptable behavior (Shay, 1994, p. 78). "Don't get sad. Get even!" was a common mantra of NCOs and officers (Shay, 1994, p. 81). Based on this, we can assume behavior of this type was not limited to a specific environment. In fact, with all the first-hand accounts from Hue, there is no evidence of losing character to this degree. Perhaps, since the fighting was non-stop against an enemy that would not break contact, such digressions were not permissible by the leadership at Hue.

Even with such events, the loss of professional military ethics cannot be considered a factor during the Union operations. In fact, at the end of Union II, one Marine company, still in contact with the enemy after the major engagement of 2 June, asked Lieutenant Colonel Hilgartner for permission to engage the enemy who were collecting their dead. The 2-5 Marines commander denied the request and used the

informal truce to collect his own fallen comrades. Even though this appears to be atypical of Marine and NVA battlefield relations, it also shows that the average Marine was disciplined enough to obey his commander and not seek easy retribution after such a brutal battle.

The one type of documented unethical behavior that did occur during the battle for Hue was looting. Throughout the battle for Hue, goods and supplies readily available in the shattered city were used without question by both sides. Captain Meadows of G/2-5 explained his company's actions, "We did take things for our use...blankets, food, water. We must have taken every candle in that side of the city for illumination for our own use at night. These things –you want to call it looting? O.K., we looted (as cited by Shulimson et al., 1997, p. 222). In other cases, the close proximity to items of worth proved to be too much of a temptation. One Navy corpsman recorded in his diary, "Looting is widespread. The ARVNs wait until the Marines secure an area and then move into loot. The Marines do well for themselves also" (Shulimson et al., 1997, p. 221). Lieutenant Colonel Gravel recalled his unit's actions, "...we took things to our use; I wouldn't kid you about that. I saw some things and I saw they were returned" (Shulimson et al., 1997, p. 221). Accusations against Marines also included the sale of stolen property and "drinking whiskey, cognac, and beer and cooking chickens" (Shulimson et al., 1997, p. 221). Yet, in the end, General Abrams, the deputy commander MACV, was satisfied with the measures Marine leaders were taking to deter looting.

The environment itself made looting possible. Marines operating in the jungle, for instance, did not find themselves tempted by much of anything. Put most simply, the material goods were just not there.

In none of the three sets of human factors we investigated can we find a qualitative difference between environments. Whereas there are more first-hand accounts describing the rigors of combat during the fighting in Hue, we do not want to make the assertion that the lack of evidence referencing the actions during the Union operations means these were any less rigorous or demanding. One potential explanation for the lop-sided body of evidence regarding human factors is that the Union operations were typical

of the large-scale counterinsurgency operations American forces conducted. Long-duration search and destroy operations were more commonplace, and thus not archived. Urban fighting, on the other hand, had not been conducted since 1950 during the Marine operation to retake Seoul. Urban fighting was a new horror requiring different tactics against an enemy that was not withdrawing as the enemy typically did in the jungle. Additionally, because of the initial overwhelming shock of the Tet Offensive, this battle received national-level U.S. attention. With this attention came media interest and the ability to better record the event for history.

Among factors contributing to heightened levels of intensity in Hue were the volume of combat noise in the city due to reverberation off the buildings, the large number of dead littering the man-made environment, and the immediate availability of valuable possessions and foodstuffs.

6. Decision Making

During the Union operations, the Marines were operating under combat rules of engagement that allowed them to bring the maximum amount of firepower to bear against the enemy. They could avail themselves of artillery close air support, and even tear gas if needed (as in Operation Swift). Also, with a flexible, combat-oriented ROE, Marine leaders at all levels were able to make their own decisions. Two examples demonstrate this best. First, Colonel Radic, commander of the 1st Marine Regiment made the decision to place F/2-1 Marines at the Nui Loc Son Base in the Que Son Basin. He understood their presence could lead to an increase in enemy activity in the basin. In essence, he used Company F as bait to draw out the NVA into a fight (Telfer et al., 1984, p. 64). In deciding to do this, he was prepared and authorized to launch Operation Union to halt the NVA activity in the basin. Secondly, during the Union II action on 2 June, Colonel Houghton, the 5th Marine Regiment commander, requested the commitment of the division reserve at approximately 1430 hours. Major General Robertson, who had been in command of the 1st Marine Division for only one day, authorized the movement of the reserve, putting two companies on the ground by 1900 hours (Murphy, 1997, p. 96). Lieutenant Colonel Hilgartner, commander of 1-5 Marines later commented, “Mal Jackson’s entry into the battle saved the day for us” (Telfer et al., 1984, p. 72). Had the

reserve not been committed at the request of the senior commander on the ground, the NVA would not have withdrawn and instead would have inflicted greater numbers of casualties on the pinned down Marines.

Given the sketchy information about the Tet Offensive and, specifically, the enemy situation in Hue, Marine decision-making did not initially help elements fighting in the city. As discussed earlier, the lack of information affected Brigadier General LaHue's decisions about the forces he would commit to the fight at Hue.²⁵ Within the first three days of the battle for Hue, forces were "piecemealed" into the fight. Lieutenant Colonel Cheatham said of this, "We thought that was really an incorrect way to employ an infantry battalion" (Martin, 2000). Additionally, LaHue gave broad-brush guidance that did not offer his subordinate commanders much to work with. Commanders would pass on guidance from LaHue without understanding the true intent beyond removing the NVA presence in Hue.

The decision by both the senior American and Vietnamese leadership to hamstring the Allied forces in Hue with a restrictive ROE was one considered to be extremely poor by most commentators.²⁶ Initially, restricted uses of artillery and close air support did not provide the Marines the necessary firepower to dislodge the NVA from their well-fortified urban positions. The decision to restrict the ROE was a political one to help protect the historical city. Additionally, up until this stage in the war, the Communists had not launched an extensive urban campaign. No one wanted cities destroyed as they had been during WWII and the Korean War.

²⁵ Willbanks claims in his piece, that one of the key failures of the Marines was their disjointed command and control structure at Hue. It is first important to note that Marine operations, whether search and destroy in rural areas or urban street fighting as in Hue, involved multi-battalion operations that were, typically, flexible organizations, adding forces as the situation developed. One could argue that the task organization of the Marines at Hue was convoluted and disorganized because elements were drawn from two separate regiments, the 1st Marines and the 5th Marines, as well as three separate battalions, 1-1 Marines, 1-5 Marines, and 2-5 Marines. This, however, is not the case, as similar organizations were established to execute numerous search and destroy operations, to include both Union operations. The typical search and destroy operation was based on more deliberate planning than the operations at Hue allowed.

²⁶ Restrictive ROEs are not traditionally only a characteristic of urban fighting. A restrictive ROE could be imposed anywhere for a variety of reasons. Restrictive ROEs have been used most recently in the Balkans by NATO and the UN.

The following from Nicolas Warr's *Phase Line Green: The Battle for Hue, 1968* (1997) best summarizes the frustrations of the Marines of all ranks in fighting under the restrictive ROE:

If them dumb mutherfuckin' politician pukeheads would just let us alone and let us do our job, we'd be outta here and back to the world in no time at all. Shit! No arty, no fixed wing, no direct support from those dumbshit, poor-ass tank crews; just our damned M-16s and grenades and they want us to root out a regiment of entrenched NVA in a day or two. Well let them dumb asshole politicians come over here and follow me around for a minute or two, and see what kind of bullshit happens when dumbshit mutherfuckin' politicians start calling the shots on the ground. Jesus H. Christ, why can't they stick to kissing asses and babies?

Obscene mumbling from pinned-down Marines overheard amid street fighting, Hue, 1968. (Warr, 1997, p. vi)

Beyond the extensive use of expletives, the basic point about the restrictive ROE in the passage above is that decisions made by those far removed from the fighting were causing operational problems for the Marines. Warr himself later adds,

This insanity, these damnable rules of engagement that American fighting men are kept from using the only tactical assets that gave us an advantage during firefights- that of our vastly superior firepower represented by airstrikes, artillery, and naval gunfire-these orders continued to remain in force and hinder, wound, and kill 1/5 Marines ...(Warr, 1997, p. 124)

Thompson later commented that his battalion's efforts in the Citadel were being watched under a microscope. "It [Operation Hue City] was the only show in town at that time. We were 12 days late and Lyndon Johnson was very adamant about getting it over with" (Martin, 2000).

E. CONCLUSION

Table 3 highlights the qualitative comparison of how the two different environments affected the performance of Marine operations in the areas of the 5 factors we have examined. The Marines performed the worst in managing information. An unclear intelligence picture, coupled with poor battlefield reporting from the city, led to uninformed decisions in regard to the maneuver of forces. In contrast, Marine search and destroy operations were built on intelligence and the ability of the commander to maneuver forces into the fight. Another significant difference in performance between

the environments was how the Marines approached time. On one hand, they were as patient as the Communists in the Que Son Basin, while on the other hand they were hastily shoved into action in the city, recklessly causing unnecessary casualties. Decision-making can be considered equally poor, with a sharp contrast between clear goals during the search and destroy operations and politically generated decisions affecting operations in the city. In both environments, the Marines were adaptive and innovative with their available technology and equipment. Because of the difficulty with utilizing fire support in the city, the Marines had to innovate with ad hoc tactics and non-organic equipment. Due to a lack of data, it is difficult to analyze human factors during the Union operations. However, the numerous first-hand accounts of bravery, trauma, and the horrors of urban fighting are clear indicators that human factors were being tested in Hue.

Table 3. Effects of the Factors on Operational Performance of Marine Forces.
Scale: Bad Effect (---) to Good Effect (+++).

Environment	Time	Information	Technology	Human Factors	Decision-making
Urban	(--)	(--)	(+++)	Inconclusive data	(--)
Non-urban	(++)	(++)	(+)	Inconclusive data	(++)

The Marines were trained to conduct search and destroy operations like those that comprised the Union series. Their organization, tactics, weapons, equipment, and planning were all designed to help prosecute the counterinsurgency campaign in this fashion. More to the point still, the combat experience of three hard years of fighting in Vietnam confirmed this approach and further shaped the doctrine and training to support the counterinsurgency fight.

Through the Union operations, the basic concepts of conducting sweeps through suspected enemy territory to gain and maintain contact with the enemy proved successful. Additionally, elements as small as companies and as large as regimental task forces could conduct the operations against enemy elements of varying sizes. The Marines had in place supporting arms and could bring additional firepower and logistical support to bear.

Artillery, close air support, and helicopter lift assets all proved invaluable during both Union operations, as well as in other, similar operations throughout the war. Making adjustments for operations in new areas using different task organizations was not an issue since all units, whether combat experienced or not, were familiar with the same basic methods of operation.

Fighting in the streets of Hue was an entirely different story. Beyond just the complexities of ground combat, the Marines fighting in Hue entered that meat grinder completely untrained. The last time the United States Marines had fought in a city was in Seoul, South Korea in 1950. By 1967-1968, “the Marine Corps had virtually cut city-combat tactics from its war time infantry training program” (Hammel, 1991, p. 97). In hearing about the action at Hue and in preparing his battalion to join the fight, Lieutenant Colonel Cheatham spent his last night in his command post at Phu Bai absorbing as much information about urban fighting as possible. As discussed earlier, Cheatham collected as much special equipment as he could muster prior to his battalion’s deployment. Items such as plastic explosives and the 3.5-inch rockets would later prove invaluable during the fighting. He also took with him a bed of knowledge from outdated manuals available to him that basically said the best way “to fight through a city was to gas the enemy, blow things up, and then clear out the ruins” (Hammel, 1991, p. 134). With his self-administered crash course in urban warfare, Cheatham became one of the most knowledgeable men in his battalion on the subject.

Despite the total lack of combat experience or training in urban combat, the three battalions that fought at Hue all learned very quickly from their mistakes and within two to three days of beginning the fight, each battalion was able to make progress in retaking the city. Of the three cases examined, this was the only victory. This can be attributed, in part, to the Marines’ ability to adapt to the urban environment. This is an amazing achievement that speaks volumes about the core training and martial ethic that were engrained in the Marines of the time.

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V. INSIGHTS FROM THE CASES

The purpose of this chapter is to perform a cross-case analysis of each factor to determine whether our hypotheses stand up to the cases. This analysis will discover trends between the cases as well as recognize any anomalies. We will also attempt to explain our findings using examples from other urban battles throughout history as well as other theories or explanations from our review of the contemporary literature. The objective of this analysis is to form a basis for understanding the factors to be used in recommending strategies for improving operational capabilities.

We must acknowledge that the inability to address the 5 factors during an urban battle does not constitute the only reason why each of the units we have examined experienced difficulties during the conduct of operations. Clearly, there are other circumstances and decisions, which contributed to the outcome of each battle. These reasons are significant and must be understood in context before proceeding with a further analysis of the factors.

At Stalingrad for instance, there were a host of reasons for the German failure. Probably the most significant problem for the Germans was that they were unable to isolate the city from the outside. Failure to shut down the Volga River traffic ensured the Russians the ability to feed a steady stream of fresh forces and supplies into the city. The Russian encirclement of the 6th Army in November also played a major role in the German defeat at Stalingrad. Cut off from outside support, the army was left to wither away. Urban operations require lots of ammunition, men, medical supplies, and repair parts. Before the encirclement, German supplies and replacements had to travel over a thousand miles to reach the front, and following the encirclement the Germans received too little to remain operational. The Germans also committed themselves to a battle for which they had little experience or doctrine. They essentially pitted their weakness at close range, positional fighting against the Russian strength of individual infantryman tenacity, hardiness, and courage. Stalingrad, in many aspects, was a failure at all three levels of war.

Suez City was more of an afterthought for the IDF and consequently the Israelis did not plan, prepare, or rehearse for the operation. Israeli units were not trained or accustomed to fighting in cities where their advantages in gunnery and maneuver were mitigated. The IDF was also overconfident going into its first urban battle, and failed to integrate infantry and heavy forces. After a series of resounding successes, including the remarkable operation to cross the Suez Canal, the IDF was sure it could grab one more prize before negotiations could begin. The Israelis incorrectly presumed the Egyptians to be a completely defeated army.

Unlike the two previous cases, U.S. and ARVN forces won the battle for Hue. However, they did experience difficulties caused by circumstances beyond the 5 factors. There was, for instance, the Marine failure to isolate the NVA from outside support, which allowed the NVA to move assets as it required (like the Russians at Stalingrad). Additionally, the Marines were not accustomed to the NVA holding its positions for so long under such intense pressure, and due to ROE restrictions the Marines were not allowed to indiscriminately use their firepower advantages, as they did in rural areas. Finally, as in the first two cases, the Marines were also untrained and unfamiliar with the nature of urban fighting.

In all of these cases, there were also some plain tactical failures. It may appear easy to associate these setbacks with urban warfare. However, it certainly appears that in many engagements the Germans, Israelis, and Marines were simply outfought by their opponents. The underlying message here is that we acknowledge and agree with the commonly regarded reasons for the failures, challenges, and frustrations experienced by all three armies. Our 5 factors in and of themselves do little to explain or account for failure. The value of analyzing these factors is that it may provide insight into how to mitigate their interaction with the environment, thus possibly helping to increase the likelihood of, or speed up, success in future urban operations.

A. PHYSICAL ENVIRONMENT

1. Stalingrad

The vast differences in terrain between the steppes and streets of Stalingrad had a tremendous impact on German operations. The open steppe and farming communities allowed the Germans the space they required to execute their doctrine of mobile warfare.

Their advantages in tank tactics, close air and artillery integration, maneuverability, and optics were fully maximized in the non-urban terrain. Conversely, the density of terrain features in a “rubbled” city negated every one of these advantages, and actually played into Russian strengths. The urban terrain compressed the German formations, creating problems in coordination and situational awareness for which the Germans were untrained. This impression is captured in the records of the 24th PD, “Terrain difficulties such as house ruins, bomb craters, narrow streets and obstacles largely limit the maneuverability and observation possibilities so that, in principle, operations of panzers in city combat must be avoided” (Mark, 2002, p. 327).

2. Suez

The streets of Suez city produced a stark contrast in terrain from the deserts of the Sinai and green belt fighting near the canal. In the desert, the IDF armor brigades were some of the best in the world. The green belt and canal did create some difficulties for the IDF in coordinating fires, and allowed the Egyptians better concealment and cover. However, the IDF still had enough battle space to maneuver its infantry dismounted to support the canal crossing operations. In contrast, Suez City took away the IDF’s ability to maneuver. Israeli tanks and infantry alike quickly became pinned down in Egyptian engagement areas and remained there until they could withdraw under cover of darkness.

3. Hue

The physical differences between the Que Son Basin and Hue were not very dramatic but still had important effects. The cultivated fields with their ditches, dikes, and canals, coupled with the heavily vegetated hills offered advantages in concealment. However, the Marines were trained and accustomed to conducting operations in such environments and were relatively effective in that terrain. Marine advantages in firepower and air movement were able to generate significant casualties on the NVA in the rural areas. In the city of Hue, the Marines were less comfortable with the terrain. Major Thompson, commander of 1-5 IN commented, “This was not the kind of battle you could high diddle diddle up the middle. Everybody outside [not engaged in Hue] still had the straw hut mentality. They had not adjusted to this kind of warfare” (Martin, 2000). Marine advantages in artillery and CAS were also mitigated more by the close proximity

nature of urban fighting and forced them to invent new methods of bringing superior fires to bear. Captain Christmas said, “It was a 35 meter fight, you were looking directly at who you were going to kill” (Martin, 2000).

In all three cases the three-dimensional, close proximity nature of the urban combat, in conjunction with the increased density of obstacles and events, acted to mitigate previously held advantages in firepower (Hue), maneuver (Stalingrad), or both (Suez City). The urban terrain in all three cases compressed previously well-dispersed formations while simultaneously decentralizing control of them. This dual effect of compression and decentralization generated by the environment created coordination and control problems in all three cases, as well as the inability to exploit advantages in maneuver or effectively mass fires. The Marines, experienced in fighting in jungle terrain, may have been better prepared to deal with the change in environments. A Marine Corps manual on jungle operations written in 1989, characterizes the similarities between jungle and urban environments: loss of control, limited observation, canalized movement, excellent concealment opportunities, and limited range of fields of fire (U.S.M.C. FM-FRP 12-9, 1989, pp. 41-42). Even so, without the ability to effectively maneuver or coordinate, all three urban fights became exercises in firepower and determination.

Russell Glenn noted a similar reaction by the Serb Army as it entered Vukovar, Croatia in 1991. The density of the urban environment compressed Serb formations and they experienced problems getting in each other’s way. In contrast, the Croat defenders were able to shrink the size of their perimeter which allowed them to free up additional forces for counter-attacks, raids, or other missions. As the Croat perimeter shrank, the Serbs had less space with which to occupy with the same number of units, creating additional coordination requirements, masking the effects of units, and providing a healthy number of targets for the defense (Glenn, 2002, p. 64).

It is probably safe to assume the Russians, Egyptians, and North Vietnamese were not entirely comfortable operating in urban terrain, and experienced their own uncertainties and degraded capabilities. However, these forces enjoyed more advantages

relative to the attacker, such as familiarity with the ground, smaller areas to defend, less control requirements in the defense, and less need to place themselves outside the protection of buildings and fortified positions.

B. HUMAN ENVIRONMENT

1. Stalingrad

During the advance to Stalingrad, the impact of civilian activity was limited, due to the sparse population of the steppes. In contrast, the nearly 600,000 civilians in Stalingrad played a key role in the defense of that city. The NKVD went to great lengths to keep civilians in the city, and the indiscriminate German fire bombings, which killed 40,000 civilians in the first day, inspired many of the civilians to assist the Red Army in the preparation and defense of the city, as illustrated by the efforts of the civilian factory workers to produce tanks while under direct fire.

2. Suez City

The fighting in the Sinai and around the green belt was not affected by the presence of civilians, due to sparse populations or previously conducted evacuations. However, within Suez City proper, the Egyptians had the foresight to mobilize and train civilian militias to defend their homes. At the same time, the Egyptians evacuated the women and children to permit these militias to focus solely on performing military tasks.

3. Hue

During the Union operations the rural civilian populations provided the North Vietnamese and Vietcong forces a great deal of logistical support and intelligence. However, in Hue, the population was more loyal to the South Vietnamese government. The execution of approximately 3,000 Hue civilians by the NVA and Vietcong created a host of refugee problems for the Marines, but for the most part, the civilian population tried to remain out of the fighting and did not play much of a role in the outcome other than as a minor hindrance to operations. The key point to note is that the NVA essentially alienated the civilian population.

In both Stalingrad and Suez City, civilian elements contributed to the defense of the city making it more difficult on the attacking forces. At Stalingrad, the intensity, stakes, and duration of the battle likely contributed to the fanatical resistance displayed by Soviet civilians, whereas the Egyptians prepared their civilians to fight ahead of time

by conducting training, equipping and evacuation of non-combatants. Hue represents a different kind of civilian interaction. The NVA and Vietcong by their mass executions alienated themselves even further from a population that leaned towards the South Vietnamese government. This alienation ensured that the civilian sector would provide little to no support for the defenders unless impressed to do so.

Alienation of the population appears to be a significant factor in predicting the outcome of an urban battle. In a study on urban warfare conducted in 1987, Roger Mclarin et al analyzed nine urban battles in which the defender was alienated from the civilian population (Mclarin et al, 1987). In eight out of nine battles the attackers won. The only exception was Arnhem, where the Germans were able to beat off the British attack. Conversely, in 13 battles analyzed in the study, where defending forces were familiar or supported by the civilian population, the attacking force was only successful eight times (McClarin et al., 1987, p. 94). The evidence from the recent capture of Baghdad suggests that the Hussein regime alienated itself from the population, thus providing one explanation as to how a city of five million people fell in a matter of days.

C. TIME

Hypothesis: In cities, time required to complete basic tasks will increase, synchronizing combat power will become more difficult, and interpretations of objective time will change.

Brigadier General Avidor's framework of analysis for time was instrumental in the examination of each of our cases in both the urban and non-urban environments. His categories of the three types of time were useful in understanding each military's approach to time as an element of planning and execution. In using his framework, three key findings were uncovered across all three cases. Time in relation to a military's objectives changed from the non-urban to the urban environments. Second, functional time required to accomplish tasks increased in the urban environment and, consequently, time required to synchronize these tasks in operations also increased. Third, each military abandoned its practice of taking advantage of all the time available to it in a 24 hour period to move, refit, and fight. In all three cases, the forces discontinued nighttime operations in the urban environment.

1. Relative Time

In all three cases, missions were more or less enemy or terrain-dependent. During the city fighting, the objectives became closely connected to time. The Germans were terrain-oriented during their offensive operations across the Ukrainian steppes. This did not stop them from effectively destroying the light resistance that stood in their path. Time was a concern only in that the Germans hoped to meet the overall campaign objectives of seizing the Caucasian oil field southeast of the Volga before winter. Yet, at Stalingrad, the Germans appeared to become overly concerned with seizing the city in a timely manner. With Soviet forces continuing to reinforce the defensive efforts in the city, and the looming onset of winter, victory in a timely manner became critical to the Germans in a way it had not been before. In the end, the Germans became victims of time requirements they could not meet.

In the Sinai, the Israelis were always concerned about time with regard to their objectives. During the counteroffensive, the entire operation was conducted under the threat of a possible ceasefire. This subsequently forced the Israeli leadership to make hasty decisions in an attempt to grab Suez City as a bargaining chip before the ceasefire was enforced. Hasty attacks in complex terrain contradicted previous operations, as evidenced by the methodical crossing and breakthrough operations where time and the potential ceasefire were secondary to the primary mission of crossing the Suez Canal and destroying as much of the Egyptian army as possible.

The Marines in both Union operations were not concerned with time as a key element of their victory conditions; they were almost entirely enemy-oriented. Marine leaders understood the long-term nature of counter-insurgency and the role that search-and-destroy tactics played. However, this changed much as in the other two cases when the Marines began to fight in Hue. With the initial decision to have the Marines help retake the city, time became a key factor. Anticipated high civilian and military casualties prompted leaders to press for a quick decision in this highly visible battle.

Concern for excessive casualties is one explanation for why leaders in all three cases dictated perceptions of relative time by demanding speedy. With this in mind, ground commanders cut corners in sound planning and execution to save time, but in the

end it actually ended up costing them more time. This is evident in all three cases as removed leaders provided specific guidance to the ground commander to execute operations quickly.

2. Functional Time

The physical density of the obstacles and the lack of operational battle space, coupled with insufficient or nonexistent urban warfare training in each case, added to the increased time required to accomplish tasks in the urban setting. One explanation for this could be that standards and procedures designed for one environment were misappropriately applied in another. If a unit was not prepared for the nuances of a strange environment, such as an urban setting, the lack of familiarity in the environment would increase the time necessary to negotiate the task. At Stalingrad, buildings were cleared with tanks and panzer grenadiers; these were the same tactics that had been used earlier on the steppe for other types of operation. Given the drastic change in terrain, these tactics took longer to complete while maneuvering through the restrictive, obstacle-filled terrain of the city. However, if different skill sets were adapted for fighting in the new environment, such as at Hue, functional time to perform tasks could be better controlled. We see this at Hue in the use of various non-organic weapons and tear gas to aid clearing operations. Data is inconclusive as to whether the Israelis adjusted their tactics for the urban environment. Their losses were so heavy on the first day of fighting in Suez that Adan refused to attempt any more attacks of that size and opted to only probe the defenses in the coming days to see if the Egyptians had withdrawn. After their experience at Suez, the Israelis did not develop a doctrine specifically for urban operations for several years.

Functional timelines and the dense compression of units generated coordination problems, which led to longer duration operations. In turn, synchronization of multiple tasks required additional time. This was seen both in Stalingrad and Hue, where progress in seizing objectives requiring coordination was consistently delayed or postponed. At Suez City, synchronization of tasks did not survive first contact. After the devastating engagement on the Sarag Road, the Israelis were concerned with only withdrawal and evacuation. Yet, in their most desperate hour, members of Adan's division were

nevertheless able to synchronize closely the evacuation of numerous wounded, scattered throughout the city. Perhaps some of these rescues were done so quickly and boldly that luck and courage were the reason for their success rather than synchronized efforts.

3. Objective Time

Why did all three fast-paced militaries, known to fight by day and move and refit by night, all stop when the sun went down during city fighting? Potentially, it was the inability of these forces to secure themselves on the move and coordinate combat operations at night. Additionally, whereas the city was already a defender's paradise by day, darkness only increased these advantages for the defender. The already handicapped ability to observe in urban terrain decreased to nil at nightfall and provided the defender with unlimited locations to establish ambush positions. Additionally, each of the militaries examined had problems securing its own forces in the complex terrain. Perimeters were often riddled with obstacles that further isolated elements. In each case there are specific reasons why forces did not operate at night, but the bottom line is simply that combination of urban environment and darkness increased force vulnerability. In order to mitigate this increased vulnerability and to avoid further control problems, to include fratricide and an inability to effectively mount an attack, all three militaries opted to hold and defend the ground they had conquered during daylight. In the greatly uncertain urban environment, this seemed the best way to maintain control of their forces and prepare them to fight the next day.

Today, this aspect of objective time could be considered unimportant as a factor of analysis, because of the rise of night vision technology that allows for increased observation, targeting, and the coordination of forces regardless of limited visibility. However, not all night vision systems are created equal, and counter measures to this technology may be in the works. Fire and smoke are very effective in mitigating passive night vision capabilities. Although the U.S. is the leader in fielding this technology, its allies may not have access to the same technology or be trained to the same level of proficiency in using night vision tactically. Additionally, the U.S. possesses a high number of these systems disseminated to as many end users as possible. The U.S.'s allies may not have these luxuries, which begs the question...Why not?

Avidor's view of time greatly differs from the accepted definition of time and how it is applied by our current doctrine. In U.S. Army doctrine, the acronym METT-T²⁷ is used to conduct an estimate of the situation to aid in planning. One "T" stands for "time available" to plan for and execute the mission. Inherent but not explicit in this definition, are all three elements of Avidor's framework of analysis. However, U.S. military doctrine does not analyze the effects of time on the mission specific to the environment. It only uses it as a tool to assist in enabling a commander to plan for what time he has available. As we have seen across the three cases, Avidor's framework easily subdivides the precious commodity of time so that it can be better considered in future planning and execution. Not only is Avidor's framework a useful tool for planning, but it also helps highlight how the militaries in each of the three cases related to time differently in the urban and non-urban environments.

D. INFORMATION

Hypothesis: In the urban environment, a military will be severely constrained in its ability to collect, process, and disseminate information.

In the comparison of the three cases we determined that the urban environment did effectively constrain the German, Israeli, and American abilities to collect, process, and disseminate information.

Collection and intelligence-gathering was made particularly more difficult by the urban environment. German ability to sense and locate Russian forces was made easier by the open terrain on the steppe; the occasional hill or balka made predictable locations for Soviet defensive positions. In the city, German forces could not use their aerial assets to pinpoint defensive positions, and Russian strengths could never be completely discerned due to the abundance of concealment. In essence, the enemy was seen only in snapshots, and poor HUMINT contributed to making the city an intelligence enigma for the German 6th Army.

On the steppe, the Germans did not complain about FM communications, ability to see the battlefield, or the ability to process all the information coming into the command and staff nodes. At Stalingrad things were much different. FM

²⁷ The Department of the Army's *Field Manual 100-5: Operations* (1993) defines METT-T as Mission, Enemy, Terrain (& Weather), Troops, and Time Available.

communications were “unreliable”, and commanders became fixed to their command posts. Major attacks involving large formations in the city became bogged down for many reasons, one of the more important being a general failure to coordinate and communicate with adjacent units and fire support assets.

IDF intelligence collection and reconnaissance during the fight in the Sinai and the green belt were excellent. Adan’s forces proved their intelligence preparation of the battlefield competency during the canal crossing. However, at Suez City, IDF reconnaissance assets were not trained in urban collection methods, the IDF did not possess detailed maps or imagery of the city, and it also lacked the time to collect intelligence because of political reasons. This led to intelligence problems, but does not necessarily constitute an intelligence failure. When compared to the previous Israeli intelligence successes in non-urban terrain, a reasonable conclusion is that the Israelis went into the city not knowing all the key information required to be successful and they paid for it.

The short duration of the Suez operation failed to reveal any trends in ability to process and share information, although the degraded ability to visualize the battlefield is captured in the experiences of Lieutenant Dudu’s trapped paratroopers. Lieutenant Dudu was painfully aware of his predicament, and was convinced that an escape attempt would be futile. Adan’s headquarters kept pressing for Dudu’s withdrawal because it could not comprehend the situation exactly as Dudu did; this disconnect in perceptions contributed to hesitation and inaction on the Israelis’ part.

The Marines during the Union operations were accustomed to planning deliberate search and destroy missions. Finding the enemy and then having the assets available to pounce on them was how the Marines operated in the non-urban setting. Within Hue, U.S. commanders from MACV down to the company level had little to no idea about the composition or disposition of the communists in the city. The city masked the information from the Marines, who drove into battle without any idea of what to expect. What is so amazing about this fact is that ARVN units had been engaged in Hue for nearly two weeks before the Marines arrived, yet failed to disseminate any of their intelligence to the Marines.

The inability to visualize the urban battlefield also hampered Marine operations. Over time the Marines began to learn from their mistakes, but commanders were untrained in controlling what they could not see or conceptually position in their minds. LaHue's inability to estimate the enemy situation or how the battle developed is the best example of Marine information challenges.

Inability to visualize the urban battlespace is the biggest trend across all three cases. History reveals that this is not a new phenomenon. British forces at Buenos Aires in 1807 were trapped by a civilian militia uprising in the city. Two British battalions, unable to communicate with their commanding general and completely unaware of the situation, surrendered en masse, despite the fact that the battalions were less than a block away from each other; each battalion surrendered because it thought the other battalion had done so already (Andrade, 1997). The other trend appears to be that hasty attacks into cities without proper IPB can lead to disaster. The Russian foray into Grozny on New Year's Eve 1995 is another example of a hasty operation conducted with little understanding of the enemy situation. That intelligence failure resulted in an urban disaster and destruction of a motorized rifle regiment (Oliker, 2001).

Stalingrad and Hue illustrate how the urban environment can affect the ability to process and disseminate information; Suez City did to a lesser extent but not enough to convince us that the urban environment negatively affects communication and information processing. U.S. Marine and German 6th Army accounts do mention frustrations with communication in cities, but do not give specific causes for these frustrations. Dr. Lester Grau's study on communication problems experienced by the Russians in 1995-1996 supports the idea that FM communications are severely degraded by the urban setting:

Tall buildings and other towering structures in a modern city absorb, interfere with and reflect radio transmissions on the FM and UHF bands. Further, industrial sites and tall buildings can degrade transmission quality and range. Prior to entering a city, signal planners must consider the nature of radio wave diffusion, carefully select the primary and alternate radio frequencies and determine what will interfere with street-level communications (both while moving and stationary). Large cities have powerlines, electric train and trolley lines, and industrial power lines that can also interfere with communications. However, there are instances

where such transmission lines retransmit an intensified signal along the same path as the transmission line. Conversely, these lines can generate from 100 to 300 times interference over normal atmospheric interference on the UHF band

A limited number of frequencies, normally on the lower part of the band, work in cities. Consequently, the bulk of enemy and friendly radios use the same bands. With the inevitable concentration of forces in city fighting, this can create a complicated electromagnetic situation in a small area. Further, as happened in Grozny, the enemy may try to enter a friendly net to misdirect forces and transmit false reports or monitor tactical communications. Therefore, the combined arms commander and his commo chief must take into consideration the terrain characteristics when selecting the command post location in order to insure maximum transmission range. (Grau, 1996, p. 2)²⁸

Sean Edwards, an analyst at RAND now at the National Ground Intelligence Center, performed a study for improving tactical communications in cities. His research found that the most intractable information requirements for urban warfare were position location inside buildings, detection of snipers, through-wall sensors, and combat identification of friendly forces, enemies, and noncombatants. Edwards also acknowledges that the urban environment creates challenges to the EMS and renders portions of bandwidth useless (Edwards, 2001, pp. 1-4).

E. USE OF TECHNOLOGY

Hypothesis: Technology, which includes technical systems and organization, must be tailored to urban settings in order to be effective.

The militaries in each case were very proficient in wielding the available technology and organizational constructs in their respective non-urban environment. The German panzer divisions were highly mobile and well synchronized forces that seized large tracts of land almost effortlessly by coordinating armor, mechanized infantry, artillery, and close air support. The Israelis in their own right were masters of the same style of warfare in the 1960s and 1970s. They were accomplished in all aspects of maneuver warfare as displayed in the Six Day War and later in their counteroffensive during the Yom Kippur War. Launching the counterattack, the canal crossing, and breakthrough operations all exemplify the high level of Israeli equipment proficiency,

²⁸ Retrieved from [<http://fmso.leavenworth.army.mil/fmsopubs/issues/urbanwar/urbanwar.htm>] on 22 April 2003.

professionalism, and training. The Union operations as well show that the Marines in 1967 were prepared to execute the long and grueling search and destroy operations through their expert employment of small unit tactics, vertical envelopment, artillery fires, and CAS.

For both the Germans and the Israelis improper employment of technology contributed to the setbacks each side experienced in the urban environment. It took a month of hard fighting for the Germans to correctly place their panzers in support behind the infantry. This occurred in mid-October during the bloody fights for the factory district. The armored dashes through Suez City were effective for seizing the initiative, but were not properly supported by lagging infantry. The Germans were unable to apply their available technology and equipment to affect victory. In the case of the Israelis, they were unable to make any gains with their humbling foray into the city. The Marines, on the other hand, were not only tactically successful in the city, but made a point of adapting to the new environment and developed innovative tactics, techniques, procedures to enhance their capabilities. The urban environment, with its existing road network, actually allowed the Marines to bring to bear more options on the enemy. The 106mm recoilless rifles (mounted both on the four-wheel “mule” and the six-barreled Ontos), M-48 tanks, bazookas, and tear gas launchers were all extremely effective and normally would not have been available in the isolated environments where search and destroy operations traditionally took place.

German panzer-infantry coordination was poor for a host of reasons and offers one potential explanation for failure to adjust employment and technology. After the major losses suffered in the fight for the factories, the Germans began to note the need to change their organization and employment of weapons, but by then it was too late to affect the outcome of the battle. This differed both for the Marines and the Israelis. The Marines had their noses bloodied badly in the first three days of fighting. When 2-5 Marines became the main effort, it happened to them as well, they too required another three days to become accustomed to the city fighting. As Captain Christmas, commander of H/2-5 put it, “we would learn a lot of hard lessons there...” (Martin, 2000). This pattern continued in the Citadel with 1-5 learning the same hard lessons by experiencing heavy casualties in their first days of fighting. The Israelis, on the other hand, had only

one major engagement on October 24 that resulted in heavy casualties and numerous units requiring rescue or escape. They suffered quickly enough that they relegated themselves to only probes for the two remaining attempts to take the city. Brigadier General Avidor relayed that the failures surrounding Suez were so significant that the IDF failed to address or develop an effective urban operations doctrine for several years.²⁹ The flawed logic behind this decision was that if a doctrine was developed it would be employed. Based on their experiences in Suez City, this would only result in more worthless slaughter and failure.

Conceptually, innovation through failure is supported by Barry Posen in *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars* (1984). He asserts that a military will innovate in the areas of technology and organization after it has met with failure (p. 47). Posen was referring to an all-encompassing doctrine of how to wage war, with the innovation coming in the aftermath of a major conflict, such as WWI in his study. Yet responses to failure, both by the Marines and later the Israelis also support his hypothesis. The Marines, as mentioned before, innovated and adapted to meet their failures immediately in the city. Their lessons would resurface over 25 years later with the end of the Cold War and the emergence of smaller conflicts. As America's "911 Force" and those most likely to conduct operations in remote third world urban areas, the Marine Corps was tasked as the Department of Defense's proponent for authoring the latest joint urban operations doctrine, *Joint Publication 03-6: Doctrine for Joint Urban Operations* (2002) and the *Handbook for Joint Urban Operations* (2000). As also mentioned previously, the Israelis did not want to face the failures of Suez City initially, but they later identified a need to develop an effective urban warfare doctrine that has seen successes in Lebanon in the 1980s and in more recent operations in the occupied territories. Today, thanks to their experience, the Israelis considered leading experts in the field of improving urban operations capabilities.

²⁹ This information was disclosed to the authors in a personal meeting with Brigadier General Avidor on 12 March 2003.

F. HUMAN FACTORS

Hypothesis: Human limits will be reached more quickly in an urban environment.

Comparing across our three cases did not convincingly prove that human limits are reached faster in urban environments. The ability to prove this hypothesis is particularly challenging given the limited availability of empirical data to accurately measure human reactions to the stress of urban combat. Our method of comparing anecdotes from soldier accounts allowed for some insights into human factors, but was insufficient for proving our hypothesis convincingly. However, the evidence did seem to indicate that something regarding human factors is at play. Even though we cannot see it, nor prove it completely, we discovered some correlations that may provide more insight into the human dimension of urban warfare, and warrant future research and consideration.

The duration and intensity of the urban battle do appear to have effects on individuals and units, and the *pre-existing* levels of combat experience, cohesion, confidence, and initial will and morale appear to have tremendous effects on establishing the limits of human systems to tolerate urban warfare. It must be remembered that each German, Israeli, and Marine unit examined had a high degree of combat experience, cohesion, and confidence going into the urban fight.

1. Limits to Human System

The Stalingrad case comes closest to showing how the urban environment affects the human limits for enduring the chaos of combat. Combat on the Ukrainian steppes was difficult and exhausting for the forces involved, yet on the steppes the contacts were intermittent, the lines clearly designated, and the range at which battles were fought was extended. Within the city of Stalingrad, sensory overload became the norm. German troops rarely slept, the enemy was continuously close by yet unseen, danger could come from anywhere at anytime, and the physical rigors and stresses of this particular fight wore down the forces rapidly.

The evidence does not suggest that the Marines fighting in the Union Operations suffered too much from combat fatigue. While the fighting was fierce during those operations, it, too, was intermittent. The accounts of Marines in Hue indicate that they

were initially unprepared to deal with the crescendo of violence and shock of continuous close combat. Marines experiencing shell shock after three days of fighting around the Citadel created the effects described by John Laurence, “They had just seen too much. Too many of their friends being killed, too much violence, too much noise, and too much fear. Their brains had shut down” (Martin, 2000).

The battle for Suez City was too short in duration to reveal any measurable effects of human limits being reached faster in the urban environment. In the green belt many Israelis fought for seventeen consecutive days and units began to wear down, but in Suez City the fight lasted less than two days and there simply is not enough evidence to support an assertion that the city wore them out.

The constant theme throughout all three cases is that the urban combat experienced was extremely violent, and that the intensity of the fighting in the city was such that in the case of Stalingrad and Hue some men broke down, or in Suez City were withdrawn from the combat before they broke down. While our cases do not prove that human limits are reached more quickly in an urban environment, there are several explanations as to why humans may experience greater difficulty while fighting in cities.

Soldiers do not naturally think of combat in three dimensions. BG Gideon Avidor of the Israeli Defense Force observed particular human limitations for fighting in an urban environment:

- We are connected to the ground and we look parallel to it.
- We grasp what we see---at the ends of the horizon.
- We think in two dimensions
 - Left/right, forward/backward
 - We use linear terminology (directions and ranges)
 - Line of sight
 - Field of view
 - Line of communication
 - Course of action (Avidor as cited by Glenn, 2002, pp. 26-27)

The combination of physical fatigue and human disposition to think linearly, places soldiers at a significant disadvantage while attempting to perform complex tasks in a dangerous and uncertain environment. This notion implies that a soldier's shelf life may be limited in the urban arena.

Michael J. Driver, a professor of organization and management at the University of Southern California, presents the idea that a human's ability to process information is directly related to the environmental load and type of information experienced. He suggests that a high load environment is made up of the following components: high time pressures, highly complex tasks, high uncertainty and unpredictable events, important consequences, and a highly charged emotional environment. As an individual moves from a low environmental load towards a high one, his ability to process information actually increases because the individual is engaged and all senses are focused on the heightened input. As the environment becomes more high load, the ability to process information drops rapidly and, in an extreme environment like that in which urban combat occurs, people may completely lose the ability to process information (Driver, 1998, pp. 40-41).³⁰ This concept may also partially explain the cause of decentralization of operations as well as the increased time requirements to perform basic tasks in a city.

Another explanation supporting our hypothesis about human limits in the urban environment comes from David Grossman, a retired lieutenant colonel and former psychology instructor at the United States Military Academy. Grossman conducted an insightful study into the psychological and physiological aspects of close combat. One of his conclusions suggests that fear alone is not enough to debilitate soldiers, rather it is fear generated by the proximity of human aggression and hatred:

Fear in and of itself is seldom a cause of trauma in everyday existence, but facing close-range interpersonal aggression and hatred from fellow citizens is an experience of an entirely different magnitude. (Grossman, 2000, p. 11)³¹

³⁰ Michael J. Driver, Kenneth R. Brousseau, Phillip L. Hunsaker. *The Dynamic Decision Maker*. ToExcel: New York, 1998, pp. 40-41.

³¹ David Grossman, "Human Factors in War", in *The Human Face of Warfare*. Ed. By Michael Evans, and Alan Ryan Allen and Unwin Australia: 2000, p. 11.

We reiterate that our analysis of the cases provides only mild support for understanding the relationship between human limits and the urban environment. However, we feel that it may be premature to conclude that human limits are not environmentally dependent. Thus, this area warrants further exploration. Israeli in exactly this area, for instance, has led them to permanently assign medics trained to identify psychological casualties.³²

2. Will and Morale

Our analysis indicates that the importance of will and morale to mission success is critical regardless of the environment. In both Union Operations, Marine esprit de corps and morale were high and undoubtedly contributed to their success. High casualty rates, long duration operations, and a determined enemy were all overcome by something more than firepower. The Marines knew how to fight in that environment and were comfortable. In contrast, at Hue, the Marines faced a challenge about which they had little experience to draw from. There were ROE constraints, old tactics and methods did not work as well, there was less certainty about the picture of the battlefield, and constant fighting; consequently, they suffered a series of defeats. In the urban environment, the glue that kept the Marines intact and able to innovate and adapt to the environment appears to have been their high degree of cohesion and morale built up through months of experience and teamwork.

At Suez City, there simply was not enough time to measure the environmental effects on will and morale.³³ Similar to the Marines, the Israelis experienced several operations in non-urban terrain, where good will and morale played an important part in the outcome. A canal crossing under pressure, or decentralized fighting in the green belt, all call for high levels of will and morale. In the city, this same high level of confidence and will and morale were evident in that, despite major setbacks and losses in leadership, the Israelis were able to break contact in relatively good order.³⁴ LT Dudu's ability to hold the remnants of his battalion together, despite tremendous fear and uncertainty,

³² Avidoer. Brief at Fort Leavenworth.

³³ The Suez City case was an excellent case for testing the factors, but due to its less than 48 hour long duration, it is perhaps not the best case to use to test human factors.

³⁴ Breaking contact under pressure is universally recognized as one of the hardest tasks for small units to accomplish.

indicate that the morale of the paratroopers was fine, and probably saved them from destruction. The fact that Israeli officers led from the front, and Israelis went through great lengths to rescue wounded soldiers, probably contributed to this high morale in the city.³⁵ How well this morale would have been sustained over time will never be known.

The duration of combat in Stalingrad, as well as the complete difference in outcome between fighting on the steppe and in the city, was sufficient for revealing some qualitative trends in the loss of will and morale, but we still do not know what the proximate cause of that erosion was.³⁶ On the steppes, confidence in systems and tactics was reinforced through battlefield success. In Stalingrad, the same victorious army met nearly continuous frustration and defeat. Add this frustration to the continuous fear of fighting in the city over a long period of time and it becomes easier to see how German will and morale declined. Conversely, Russian morale seemed to improve in the urban environment. The Russians did not surrender or retreat with nearly the same frequency or scale as previous fighting on the steppes had demonstrated.

The constant theme across all three cases seems to be that a high level of will and morale is necessary for intense urban operations. What we cannot prove is how time and the environment affect levels of will and morale. Yet ironically, the urban environment in some way brings the importance of will and morale to the forefront because of the isolation and uncertainty that both individuals and units can experience, as well as the continuous close range combat that over time must take its toll. For example, the importance of will and morale to soldiers in a WW I trench line undergoing a chemical attack was certainly high. However, in the trench line, soldiers could look left and right and see and even touch their comrades and leaders. The enemy was to their front and at extended ranges. In contrast, in the urban environment, soldiers often cannot see their leaders, have little idea where the enemy is even though he may be nearby, and can often become isolated in rooms or buildings. These differences in environments create different strains on individual morale.

³⁵ Israeli units fighting in the Golan Heights during the same time frame reveal the significance of officer example and care of casualties to overall morale of a unit (Kellet, 1982, p. 37).

³⁶ After all, the Germans fought inside Stalingrad continuously for months.

Will and morale take on greater importance in the urban arena because units fighting battles at the small unit level often have little else to fall back to. Clausewitz hints at this notion when he suggests:

A regular army fighting another regular army can get along without military virtues more easily than when it is opposed by a people in arms. For in the latter case, the forces have to be split up, and the separate units will more frequently have to fend for themselves. Where troops can remain concentrated, however, the talents of the commander are given greater scope, and can make up for any lack of spirit among the troops. **Generally speaking, the need for military virtues becomes greater the more the theater of operations and other factors tend to complicate the war and disperse the forces.** (Paret, 1976, p. 188)

SLA Marshall also hints at the greater importance of individual will and morale in the city. In his study on urban warfare, Marshall makes the following suggestion:

As imagination takes over, the danger at one's back seems greater than the danger that probably lies forward. Maintaining friendly contact comes as hard as locating enemy points of resistance. So stress-laden is the task that the forward tactical elements must be frequently shifted with the frontal fire teams rotating hourly or so. Such duty is more wearing on the individual foot fighter than being under heavy sustained fire as one of a company. (Marshall, 1973, p. 16)

3. Morality and Ethics

The cases by themselves do not suggest that urban environments cause morality and ethics to erode faster than do other environments. We based our initial hypothesis on the notion that higher intensity, greater visibility of death and its effects, closer proximity to and the mere nature of the killing, and the inability to escape the circumstances over time would cause degradation in morality and ethics at a faster rate than in non-urban environments.

No case convincingly shows a loss of morality and ethics, but there are some indicators that these can change over time. For example, at Stalingrad Russian POW rates dropped significantly between the non-urban and urban environments, and records from the 24th PD which indicate humane treatment of civilians during the advance to Stalingrad, report problems and issues with looting and other “degrading” acts against Russian civilians in Stalingrad.

At Hue, the number of POWs captured by the Marines declined despite an increase in the intensity and duration of the fighting. This decrease can be attributed to any number of things, one of which may be the fact that Marines were given guidance to shoot if there were any doubts, and the fact that they would throw grenades into rooms first and then see what was in there after.

There was no evidence to suggest that Israeli ethics changed in Suez. The short duration of the operation most likely had something to do with this.

In general terms, morality is the sense or awareness of right or wrong, and ethics are how a person acts in relation to that sense or awareness. While we could not prove it in our case analyses, it still appears that the tremendous stress and emotion experienced by units fighting in close quarters in the streets, coupled with isolated and decentralized operations and loss of authority figures negatively impacts the ethical behavior of soldiers, causing them to act in ways contrary to their awareness of right or wrong. Over an extended period of time, the urban combat environment may even erode their sense of right or wrong. From the sack of Jerusalem to Grozny, mass executions, torture, and rape characterize many of history's most violent and prolonged urban battles.

The ethics and morality factor of the human dimension demonstrates the darker side of urban warfare, and that given the right conditions and length of time nearly all elements of the human system can degrade to an instinctual and primordial level. Again, this could happen in any environment, but may be more likely in the urban environment.

Psychiatrist Dr. Jonathan Shay specializes in the treatment of combat veterans suffering from chronic post-traumatic stress disorder. His study, Achilles in Vietnam, examines the nature of going berserk. According to Shay, soldiers that are trapped, surrounded, isolated from friendly elements or leaders, facing certain death, or lusting for revenge are vulnerable to going berserk (Shay, 1994). One of the characteristics of berserk behavior is cruelty without restraint or discrimination (Shay, 1994, p. 82). Shay's preconditions for going berserk—specifically being isolated, surrounded, and leaderless—seem to be more prevalent in urban fighting. If this is the case, than the

consequences of indiscriminate and merciless rage can be expected in the city where the consequences of breakdowns in discipline, motivation, and ethical behavior are more severe and visible.

The ability to understand human behaviors is as important as understanding the enemy and the environment; control depends on the ability to predict, manipulate, and harness human energy and limitations. While the results are inconclusive in this area, the importance of this factor is clearly not and calls for further study. As Roger Spiller noted, “war is the most human at the very place where humanity is in the greatest danger of extinction: in the killing grounds and zones of combat, where men devote every impulse of their mental and physical energy to destroying one another” (Spiller, 1991, p. 47).³⁷

Despite the fact that our findings were inconclusive in this area, based upon a shortage of empirical data, we feel that morality and ethics are an important consideration in urban warfare, even if only because there is greater visibility of these immoral and unethical acts, and the stakes in terms of costs to civilians, cultural icons, and economic infrastructure are higher. We feel that the importance of morality and ethics in warfare warrants further study.

G. DECISION-MAKING

Hypothesis: Decisions to prosecute operations in urban areas will be **made** at a higher level than a traditional non-urban battlefield where the same size forces would operate. Decisions made at higher levels will convolute the decision-making process and chain of command.

Would Hitler have continued to attack Stalingrad if he knew he would have lose a 250,000-man army? Would General Gonen have even considered authorizing the attack on Suez City if he knew Adan’s forces did not have a chance? Would Lieutenant General Cushman, the III MAF commander have allowed his Marines to be piecemealed into Hue and then tie their hands with an overly restrictive ROE if he could foresee the aftermath? The answer to all these questions is a rhetorical no. Yet, all these decisions were made with other than military necessity in mind. Poor decision-making beyond the everyday tactical mistakes in each of these cases contributed to failure in two (Stalingrad and Suez)

³⁷ Roger J. Spiller, “My Guns: A Memoir of the Second World War”, *American Heritage*, December 1991, p. 47.

and a prolonged battle with heavy casualties in the third (Hue). The three examples above show a distinct disconnect between military necessity and political aims. In the non-urban fights, these disconnects did not exist, or not to the degree that they required far-removed leaders to reach down and direct elements over which they did not have visibility.

In comparing the decision-making in each case between the two environments, units were subjected to decision-making at a higher level in the urban than the non-urban environment. Hitler personally made the decision to seize Stalingrad at all costs, when just a few months prior, taking the city was not even a consideration. At Suez, political pressure to seize terrain for bargaining chips led to an ill-prepared and poorly executed attack by an otherwise combat-proven and highly successful division. The battle for Hue drew the attention of leaders at every echelon, from the 1st Marine Division commander to President Johnson. The messy fighting and slow progress under the watchful eye of the American media made the political decision-makers impatient to end this type of fighting.

In comparison, prior to the city fighting, decisions affecting the same size unit (e.g. a battalion or division) were held at a tactically more suitable level. Battalions were being direct by regiments, divisions by corps etc. The non-urban operations were still important and difficult, but emphasis beyond military necessity to accomplish the mission was not apparent in any of the cases. Reasons for this could include: the complexity of the operations in the urban environment, the symbolic prize of capturing a city, or the fear of public opinion turning against efforts to fight in a city. It is fitting that decision-making is the last factor we analyze because the effects of the other factors examined can play a role in why decisions were made at a higher level in the city.

First, if the notion that the urban environment presents different challenges is accepted, then logic would suggest that these challenges would concern higher-level commanders. They may feel the need to take control and direct action rather than watch the situation develop. At Suez, Dudu appealed directly to Gonen to send tanks in to get

him out. Gonen countermanded Adan's orders and directed that a force be sent back into the city to retrieve the trapped paratroopers. Only personal intervention on Adan's part prevented that rescue operation from happening.

Second, the urban environment's effects on Avidor's categories of time also affect decision-making to a degree. The fact that tasks and operations simply take longer may have concern decision-makers and drive them to want to see more progress faster. Third, the sheer lack of information about the actions available in a city may drive decision-makers to reach down and find the ever-elusive commander's operational picture. A far removed decision-maker no longer receives accurate information about the situation, he could take measures to ensure he receives it.

Finally, the potential magnification of human factors, such as the embarrassing loss of will and morale and the potential ethical failures like looting that a military could commit in the condensed human environment of cities, may lead decision-makers to closely supervise the city fight. Immoral and unethical acts could cause severe damage to the political aim and negate the efforts and success of military action. Overly restrictive ROE, of the sort seen at Hue, are an indicator of political pressure to control the possibility of bad behavior. Essentially, we discovered that *potential* pitfalls, complications, lack of visibility, and costs associated with fighting in the urban environment tempt removed leaders in micro-managing urban operations.

H. FRICTION

As we suggested in the first chapter, friction is inherent to each of the 5 factors. Clausewitz says that, "Friction is the combined effect of differences between our constructs of unfolding military operations and their actuality" (as cited by Watts, 1996, p. 7).³⁸

However, it must be noted that friction affects both sides in proportion to their ability to interact with the environment. Clausewitz originated the concept of friction in war. He presented the notion that friction is an inherent construct in war. He cites two axioms of war, which lead to the presence of friction:

³⁸ Bob Watts Article Retrieved from [<http://www.ciaonet.org/wps/wab03/wab03.pdf>], March 2003.

- Numerous chance events, which touch everything.
- Numerous difficulties that inhibit accurate execution of the precise plans that theory tends to formulate (as cited by Watts, 1996, p. 9).

From this foundation, Clausewitz developed eight factors which contribute to friction and its effects (Watts, 1996, p. 9). These too, may be magnified in the urban environment.

1. Insufficient Knowledge of the Enemy

The enemy is rarely seen in an urban environment, and when he is seen it is for brief moments. The enemy may be impossible to distinguish from among the masses of civilians. Enemy intentions are harder to discern, as is his organization, because he is seen in snap shots only. In all three cases we determined that insufficient knowledge of the enemy played a role in poor decision-making and execution.

2. Rumors

Rumors typically plague armies and generate uncertainties within the minds of soldiers. In a city so little is known, communication and control are so difficult, and operations are so decentralized that rumors can run rampant. We saw no clear reference to the effect of rumors in the three cases we examined, but there doubtless were rumors because there always are.

3. Uncertainty About One's Own Strength and Position

The urban environment makes it more difficult to not only see the enemy, but to see oneself, and to see oneself relative to the enemy's position. In all three cases, we saw how the environment led to a decentralization of operations.

4. The Uncertainties that Cause Friendly Troops to Tend to Exaggerate Their Own Difficulties

For an exhausted, uninformed soldier engaged in close quarters battle, nothing else but his own difficulties matter to him. CPT Christmas, LT Dudu, and LT Stempel all repeatedly noted their extreme difficulties. In Dudu's case, General Gonen was prepared to commit tanks to relieve his soldiers until convinced otherwise by Adan. In the end, Dudu did not need the tanks and was able to successfully withdraw. His fear and uncertainty appear to have contributed to his exaggerations of his situation.

5. Differences Between Expectations and Reality

The complex urban environment hampers soldiers' and leaders' ability to equate expectations and reality. In all three cases, there were clear differences between expectations and reality, and these differences caused delays, uncertainty, hesitation, or complete mission failure.

6. The Fact That One's Own Army Is Never as Strong as it Appears on Paper

The urban environment can easily make symbols on a map appear more coherent, intact, and organized than they are. This, in turn, can lead to disconnects between the reality on the ground and the mental images of the battle in the minds of decision makers. In all three cases, the pull to control the situation—from Hitler to LaHue to Gonen generated friction because these decision-makers never fully understood the actual capabilities or shortcomings of the units involved.

7. The Difficulties in Keeping an Army Supplied

This could apply to any situation, but getting supplies to forces inside a city presents a series of challenges. In all three cases, ammunition supply and casualty evacuation presented problems that impacted operational effectiveness.

8. The Tendency to Change or Abandon Well Thought Out Plans When Confronted with the Vivid Physical Images and Perceptions of the Battlefield

When fear, chaos, sensory overload, and uncertainty kick in on the high end of urban fighting, plans quickly change, privates become generals, primordial combat ensues, and survival becomes the priority. Again, in all three cases, there were examples of operations abruptly changing because of the intensity of violence and ferocity of the defender's resistance.

In each of the cases we examined, militaries had problems accounting for the friction generated by the interaction of the 5 factors and the environment. Friction magnified by entering urban combat affects individuals to an extent, but its greatest impact is on units and operations. The effects on units are exemplified by difficulties in non-combatant management, navigation, integrity of formation, synchronization of systems, higher incidents of fratricide, greater decentralization, and continuous flux

between military objectives and achieving the end state. To mitigate as much of this friction as possible, we have compiled a series of recommendations we present in the next chapter.

VI. CONCLUSION

A. RECOMMENDATIONS

Our recommendations are derived from the analysis of the cases. Recommendations include conceptual, organizational, and technological changes that will help mitigate the effects of the factors that influence combat in the urban environment, and which we believe will improve our capabilities for conducting urban operations.

1. Time

Examination of the cases shows that each military approached Brigadier General (retired) Avidor's categories of time differently in the non-urban and the urban environments. Since trends show time was approached differently in the two environments, developing an understanding and application of Avidor's framework for analysis may prove beneficial. His framework of analysis would be valuable to U.S. military doctrine to aid in conducting mission analysis, planning, and execution. His easy-to-apply categories of time (*relative, functional, and objective*) can provide insight to commanders, planners, and operators at all levels from tactical to strategic. His framework can also expand the limited approach to time that currently consists of backwards planning and time available analysis.

Operations in urban environments should avoid time-based constraints or synchronization. Across all three cases there was a failure to properly calculate functional time. As a consequence, each force experienced an unraveling of operational synchronization and, in some cases, a loss of tempo and initiative. In general terms, event-based planning may be a more effective way to plan urban operations. Event-based planning needs to account for tactical, operational, and strategic level views of time estimates. Time disconnects between these three levels can become a cause for poor decision-making. The first step in avoiding these disconnects is to give the small unit tactical level commanders the latitude for driving the time and synchronization tables.

In the same light, urban operations planners should attempt to make time an ally, not an adversary. Avoid constraining forces with time. Rather, allow perceptions of time to adjust to the situation. In cases where perceptions of time cannot be altered, such as during a NEO, the existence of small tailor-made forces such as SOF or Marine units is one way to mitigate the effects of relative time. Another method for avoiding the ill effects of time constraints on urban operations may be to adapt a long-term or unconventional approach. This would require preparation and deliberate planning to help develop the operational area for large scale-operations. Here, time for deliberate and not impromptu planning would be essential.

2. Information

Our analysis leads to three specific sets of recommendations. These are: improving situational awareness, dealing with the loss of tactical leaders, and designing information systems that are reliable and can endure the hardships of the urban environment.

a. Improving Situational Awareness

In all three cases, the ability to sense the battlefield and communicate was restricted to varying degrees by the urban environment. In the complex, three-dimensional urban environment, commanders will continue to have difficulty visualizing their forces scattered across the battlefield. To improve this may not require the technological ability to see the urban battlefield through remote sensors. This may actually overload leaders and make the information (and the technology to transmit it) a burden, as well as create the risk of luring commanders into the fight when their efforts could best be utilized assessing outside events.

Nevertheless, it is essential to improve urban sensing capabilities. Nor does this end with the commander. These capabilities are crucial, especially for the lowest level leaders who need to be able to manage the sensing assets as they see fit, while also having the time to fight, control, and coordinate their elements. Increased urban awareness is critical. However, with increased information flow, various nodes within the chain of command can become overwhelmed with information. This was seen

in each case with chaotic radio nets and massive amounts of information being transmitted, but often not properly received or analyzed, let alone disseminated to the elements that needed it.

Controlling the flow and volume of information is a product of organizational design and practice. Reporting channels and information relationships that work well in non-urban environments may not be suited for the city.³⁹ That notion at least deserves some experimentation. Information networks might be an answer. Sharing common imagery, video, and other information simultaneously could empower the leaders of decentralized operations, while freeing higher commanders of the responsibility to report back down the chain.

Initial intelligence preparation prior to going into an urban area is vital. In all three cases, the attacking units went into the urban battle with poor visibility and analysis of the enemy, and in all three cases they suffered serious initial surprise and subsequent setbacks. For hasty attacks to succeed in the urban setting, quality IPB is necessary. In the U.S. context, expeditionary forces may have a disadvantage in quality IPB. Unlike the Israelis in the West Bank, or Russians in Chechnya, U.S. forces are prone to be unfamiliar with the environments that they are heading into, and very unlikely (given current trends) to have established HUMINT networks. The use of SOF or other agency assets to conduct operational preparation of the battlespace (OPB) could close this gap for U.S. expeditionary forces.

Additionally, information sharing between U.S. information collectors, analyzers, and allies will be key to developing the intelligence picture. Had the ARVN shared its intelligence with the U.S. prior to committing the Marines inside Hue, the Marines would not have been surprised on 31 January with Gravel's initial assaults and later Thompson would been better prepared for the Citadel fight.

³⁹ Sean Edwards of RAND proposes using ideas from organizational theory to reexamine information flows in order to increase efficiencies of reporting in urban environments. He also proposes that commanders learn to recognize "zones of situational awareness" or areas where the urban environment will have the greatest impact on information flow such as sewers, EMS deadspace etc...(Edwards, 2001, p. xiii).

b. Dealing with the Loss of Tactical Leaders

The urban environment obstructs command and control of units, forcing them to operate in decentralized manner. The loss of leaders coupled with these environmental effects reduces the control of forces. Yet, even with loss of a leader, information must still flow. Just as Lieutenant Dudu, the battalion S2, took charge in the police station in Suez, so will countless unprepared junior leaders and soon-to-be leaders take charge in future situations. U.S. military culture always assigns a chain of command. In the urban environment, where elements will be pulled apart by the terrain and enemy, we need to ensure forces are trained to handle uncertainty and take charge when warranted. This will require higher standards for our junior enlisted enabling them to take charge and lead by example immediately following the loss of their first-line supervisors. Some of the active measures we can take to improve unit ability to deal with loss of leaders, and truly enable “privates to become generals”, include the following: simple operation schemes, reliable and redundant communication systems, mental preparation for taking charge, greater redundancy and division of labor in leadership roles⁴⁰, and training which thoroughly tests junior leaders’ ability to step up and assume roles of greater responsibility.

c. Design Information Systems that are Reliable and Can Endure the Urban Environment

Even though the cases did not fully demonstrate the effects of EMS disruption or other communications failures, we know from recent studies the limitations of the EMS in the urban environment. Information systems designed for urban operations must be able to overcome these limitations. Soldiers burdened by the weight of these systems must be able to depend on them. Information shortages caused by battery failures, enemy jamming, operational security violations, network failures, or too much traffic on the same bandwidth, will create distrust in the information, and only serve to add to operational friction.

⁴⁰ The Israelis sometimes use two company commanders in their units. One is up front in the fight, while the other is further back orchestrating the battle. This insight came from a discussion with Brigadier General (retired) Gideon Avidor of the IDF in March 2003.

Similar to operational reliability, is the ability for the system to endure the hardships of the environment. Hardening of communications systems will be important. This is particularly important where communications platforms are vulnerable to high volumes of close-range small arms fire, as in a city. Improvements may be made in the form of a wireless network, redundant radio sets, or the ability of all crewmembers to communicate externally from the vehicle

3. Use of Technology

a. Urban-Specific Vehicles and Weapons

All three cases demonstrate the use of and need for armored fighting vehicles in the city. The tanks in these conflicts were infantry-friendly, e.g., capable of supporting infantry-heavy operations. If urban operations of all levels of intensity, from peacekeeping to open warfare, are expected in the future, vehicles specially designed for the challenges of the urban environment may be warranted. An urban-specific vehicle would need to be light enough to be rapidly deployable, but armored well enough to defeat direct hits from two of the world's most widely proliferated small arms, the rocket propelled grenade (RPG) and the 12.7mm machinegun. These vehicles would not require advanced technology. The environment and the nature of urban fighting could degrade many of the technologically advanced systems that could be emplaced, such as sophisticated onboard gunnery computers and communications. However, communication systems that are compatible with infantry portable systems will continue to be vital. The Achzarit⁴¹ infantry armored vehicle used by the Israelis is a variant of the T-55 Soviet tank with the turret removed and a troop compartment built in the rear to support urban operations (Foss, 2002, p. 300). It can withstand the RPG at close range and still support infantry operations with logistical and medical support as well provide automatic small arms fire. This is a vehicle designed with one purpose in mind: urban warfare.⁴²

⁴¹ Brigadier General (retired) Avidor relayed that *achzarit* is Hebrew for "cruel." *Achzarit* is the female form of the adjective *achzar* used for a form of a body, like a vehicle.

⁴² Brigadier General (retired) Avidor relayed the Achzarit's protection capability during a presentation at the Foreign Military Studies Office, Fort Leavenworth, KS on 12 March 2003.

A future infantry-friendly tank should likewise be considered. Such a tank would need to support infantry directly with a main gun that provides shock effect, like the M-48's 90mm, without destroying everything in its path. Lightweight tanks that can maneuver in tight streets without clumsily "rubbling" buildings and carving up road surfaces would be especially beneficial.

b. Additional Technologies

In Stalingrad, German after action reports made mention of the need to conserve manpower. Technology can provide assistance in this area. If infantry strength is critical in the urban environment, then machines should conduct tasks that typically place infantry at the greatest risk. Locating the enemy and then getting to him often results in some of the highest casualty-producing operations. Therefore, reconnaissance and breaching machines should be developed to *complement* human assets assigned to those perilous missions.

At both Stalingrad and Hue, the defenders attempted to remain in close proximity to the attacker to nullify attacking advantages in CAS and artillery. These hugging tactics are still in use today, and there is a high probability that U.S. forces will experience them in any future urban fight.⁴³ Therefore, weapons that can be used to take advantage of close enemy proximity, such as thermo-baric weapons, overpressure and concussion munitions, and possibly even sonic weapons that can terrify, stun, or disorient an enemy should be developed and then incorporated into training and organization. In essence, forces should have psychological and physiological weapons that terrorize, stun, or kill the enemy at close ranges without exposing friendly troops to needless risk.⁴⁴

c. Non-Lethals

The use of effective non-lethal weapons will help defeat an enemy without destroying the urban infrastructure. Rubbling the city makes it difficult to maneuver in, use later, and leads to costly postwar rebuilding efforts. Additionally, in Hue many of the casualties were caused by falling debris and not enemy fire (Martin, 2000). In Stalingrad,

⁴³ The Chechens were notorious for hugging tactics in Grozny (Oliker, 2001; Grau & Thomas, 2000) from an article published in the Marine Corps Gazette, April 2000 Retrieved from [http://fmso.leavenworth.army.mil/FMSOPUBS/ISSUES/Rusn_leslrn.htm].

⁴⁴ Tim Thomas, in the RAND publication *Denying the Widow Maker*, suggests that sonic weapons could be developed to penetrate concrete walls and induce nausea, "an endless smoke detector" (as cited in Glenn, 1998, p. 58).

extensive destruction only slowed the heavy panzer forces. By reducing rubble, maneuver can be increased. Numerous non-lethals are an alternative to overbearing firepower that could work against a military force. Non-lethals that are currently being used by law enforcement need to be considered for combat roles, much like the Marines innovated and began using tear gas during the battle for Hue.

Non-lethal weapons can be used to reduce the total damage and suffering, but also should be viewed as a means of generating confusion and overload within an enemy organization. The urban environment, as we have seen, degrades information. Remote demonstrations, such as clusters of pyrotechnics or other devices, can be used to introduce further confusion into the enemy's decision cycle.

d. Training

The biggest failure across all three cases was lack of training for urban operations. There is an expansive literature on this subject, so details are not critical here.⁴⁵ What is important, however, is to identify the need to adapt organizations and weapons systems. This may seem like common sense, yet three competent militaries all entered the urban environment fighting just as they did in non-urban environments. Of those three, only one successfully adapted to the environment to win its battle.

Training for urban operations will require realistic sites to conduct expansive operations that allow commanders to implement new technologies and tactics, and recognize how some of the frictions we have discussed here unfold in a *long-duration* urban operation. Given the differences and challenges we have described in the urban arena, training needs to reflect these challenges realistically and test combined arms application and higher command and control systems. With this level of realism, the trends in friction we have identified will manifest themselves and commanders will be able to prepare for them in combat.

All three cases demonstrated the intensity of urban fighting. Given the increased importance of the individual in urban combat, training programs should focus more intensively on preparing individuals to endure the decimation of their units in the

⁴⁵ Two of the more notable works available beyond U.S. doctrine include *Denying the Widow-Maker: Summary of Proceedings of the RAND-DBBL Conference on Military Operations on Urbanized Terrain* by Glenn R. et al, (2000) and *Capital Preservation* by Glenn, R. (2001). Both are comprehensive compendiums of urban operations lessons learned and techniques.

urban environment. The 75th Ranger Regiment's individual training philosophy, for instance, focuses on four basic components of individual training that could be adopted. Since these four areas are: physical fitness, marksmanship, small unit drills, and individual medical training. Many aspects of the Ranger Regiment's philosophy are urban-related, from climbing obstacles during physical fitness training to close-range and off-hand firing techniques, and from room clearing to individual medical skills. With these essential "blocking and tackling" skills, the Rangers possess the *flexibility* to respond rapidly to chaos, loss of leaders, and isolation.

e. Organization

The Germans and Marines both learned to adapt their organizations during the conduct of the fighting. Both utilized combined arms efforts to fight in the city. The Israelis almost exclusively now deploy for urban operations in combined capabilities battle groups. Media footage from recent actions in the occupied territories shows Israeli infantry, armor, bulldozers, and dog teams all working within a couple buildings of each other. The Russians also rediscovered the value of task organizing combined arms battle groups during the later operations in Grozny (Grau & Thomas, 2000). The power of battle groups in urban warfare is that they allow for different capabilities to be used at the smallest levels, and since decentralization of operations most inevitably occur, it makes sense to push these capabilities down to the lowest level, be they Ontos recoilless rifle systems, combat engineers, or direct fire support artillery.

One of the requirements for battle groups to be effective is that there be strong unit cohesion. Cohesion takes time to develop; therefore, it may be necessary for these company and battalion level battle groups to become permanent organizations. Task organizing these forces "on the fly" is a haphazard way to go about forming these groups because urban combat tests cohesion and is not at all the situation in which to build it. For expeditionary force concepts to work in the urban context, the prerequisite forces must be cohesive before deployment. The U.S. should consider building these habitual combined capabilities units in peacetime, not just prior or even during operations.

The experiences in Stalingrad, Suez City, and Hue also demonstrate the added value of combat engineers and snipers. Both engineers and snipers should be incorporated into units designated to fight in cities, and special schools and equipment should be developed to further test the potential of these two very important urban combat multipliers.

4. Human Factors

Even with inconclusive results across all three cases, our preliminary research reveals how important it is to pay attention to human factors and understand that limits may be reached differently in the urban environment. The IDF, for instance, goes out of its way to mitigate human factors in urban fighting via two procedures worth consideration here.

a. Force Rotations

First, the IDF uses a shift rotation of forces to keep constant pressure on the enemy with fresh troops. Entire units are assigned a shift and rotated daily, as might be done in factories. Usually operating on a 12-hour cycle, an element will conduct operations during a block of time that is equally divided between hours of daylight and darkness. As revealed in our analysis of time, darkness decreases the tempo of operations and potentially increases stress through the added uncertainty of the environment.

b. Treatment of Psychological Casualties

Another procedure the Israelis have integrated into their operations is the identification, treatment, and return to duty of psychological casualties. Front-line medics and surgeons are tasked to identify and evacuate potential psychological casualties. The soldiers are kept in close proximity to their parent unit, usually at the brigade-level aid station. Here, confidence is instilled and they are encouraged to return to help their comrades. By insulating these casualties, the Israelis have had great success in returning soldiers quickly to their units.⁴⁶

⁴⁶ Brigadier General (retired) Avidor relayed this procedure during a presentation at the Foreign Military Studies Office, Fort Leavenworth, KS on 12 March 2003. Tim Thomas observed that of the 1,312 Russian paratroopers surveyed after the first battle of Grozny in 1994-1995, 72% of them suffered from some form of psychological disorder ranging from weakness to pathological disorders (as cited in Glenn, 1998, p. 57).

c. *Heading Off Unethical Behavior*

If future operations can be anticipated in urban areas, then plans need to be put in place to deal with the possibility of looting and other unethical behavior around civilian populations. The fact that urban areas are large concentrations of civilians only increases the opportunities to loot and engage in other forms of misconduct. Of the cases examined, the Marines came the closest to having these problems at Hue, but checked them quickly once leaders were made aware. New methods may have to be developed to ensure that combatants obey standards, particularly since leaders may easily lose direct control over units scattered in different buildings, etc.

c. *Building Teams to be Ready for Urban Combat*

In all three cases, high levels of will and morale, experience, and cohesion were essential to maintaining unit integrity and sustain soldiers' ability to conduct operations under duress. U.S. units may find themselves thrust into urban combat without the "luxury" of being able to develop combat experience in a non-urban environment. Here simulations may prove useful, though any such simulations should test more than operational concepts and constructs. They should also test and challenge individual senses. Simulate sensory overload, and test cohesion and commitment in leaders at all levels by forcing them to deal with isolation, panic, uncertainty, and setbacks. Without question, teaching units through training and simulations cannot replace real combat experience, but it can build a base of confidence for dealing with severe psychological and physiological stress, while simultaneously teaching the usefulness of self-reliance.

Another consideration is the amount of equipment carried by soldiers. In all three cases, soldiers carried their weapons, some ammunition, and water. They had little body armor, packs, or equipment to bog them down. Weight is an important consideration, especially with modernization efforts, which may force soldiers to carry heavier loads. SLA Marshall observed in *Notes of Urban Warfare* (1973),

To be emphasized above all else is that infantry in the attack must travel light. To overload is to invite defeat. Nimbleness of foot is the prerequisite for its [urban] skirmishers (Marshall, 1973, p. 20).

5. Decision-Making

Of all the recommendations we have made, the one regarding decision-making is the easiest to make yet, the hardest to implement. As we saw in each of the cases, when high-ranking leaders became more actively involved they usually convoluted the decision-making processes of operational units. To prevent this convoluted command behavior, commanders on the ground as well as advisors to higher-ranking decision-makers will need to recognize the hazards they can cause forces engaged in combat. To avoid detrimental interference, the high-ranking decision-maker will need to be introspective about the potential consequences of his actions. Second, subordinate commanders and advisors will need to demonstrate moral courage and remind leaders of these potential pitfalls. As with most of our recommendations, this is a matter of problem identification and prevention. Two indicators of an improper balance in decision-making are lack of harmony between the political will and military necessity regarding particular objectives, and the willingness of leaders to skip the chain of command to affect action. How to avoid this imbalance should be addressed in initial campaign strategy formulation and then updated occasionally to ensure a proper fit with changing circumstances. This especially applies to ROE.

6. Operational Concepts

In each case examined, none of the militaries went into the battle with an operational concept developed specifically for urban combat. Our research indicates that the Germans and U.S. Marines modified previously used tactics and techniques to fit the urban environment. In all three cases, the attackers met with initial failure, and only in the case of the Marines was the attacker able to adjust tactics in time to manage a victory. Therefore, we feel that urban-specific constructs should be examined and tested to see if there is a way to win urban battles without having to go through an “adjustment” period, with all its associated risks and costs.

At the heart of all our suggested operational concepts is the idea of “constant pressure.” Brigadier General (retired) Avidor mentioned the concept of constant pressure as a means to defeat an urban opponent.⁴⁷ As the term implies, constant pressure is the

⁴⁷ Brigadier General (retired) Avidor presented this idea during a presentation at the Foreign Military Studies Office, Fort Leavenworth, KS on 12 March 2003.

result of continuous effects placed on the enemy throughout his organization. Over time, the effects of this pressure will be enough to break the organization, and the continuous nature of the pressure will ensure that he does not have the opportunity to efficiently maneuver forces and assets or regain/seize the initiative. Constant pressure can take on many forms, and its real benefit lies in how its effects are compounded by the urban terrain. The enemy is subject to the same environment and must account for the same five factors in some way, shape, or form. If possible, we should make the urban environment as unfriendly as possible for our foes, while simultaneously trying to use to advantage ourselves. Listed below are a few concepts that seek to take advantage of the power of exerting constant pressure on a foe in an urban environment.

In all three cases we saw the attacker attempt to defeat the enemy by first destroying his physical capability to resist. As the defender lost assets, his organization began to erode, followed shortly by his will to fight. Except for Hue, we never saw the attacker fully destroy the physical ability of the defender to fight. Major General (retired) David L. Grange, in a briefing on urban warfare, made the following recommendation for fighting an urban opponent that is in line with the application of urban pressure. He suggested that instead of the “traditional” manner of destroying an enemy physically, followed by destroying his organization and then his will, U.S. forces should attack enemy will and organization with the same power, speed, and vigor that we go after him physically. Grange suggests that by doing so, actual costs in terms of violence and time will substantially decrease (as cited in Glenn, 2001, p. 306).

A means to accomplish this end may entail the necessity of integrating SOF and conventional forces to achieve the necessary volume and diversity of combat power to overload enemy organizations and break down the enemy’s will through physical and moral isolation and denial of sanctuary. Conventional attacks in conjunction with SOF efforts to conduct unconventional warfare would help isolate the urban environment conducting raids on peripheral targets could help discombobulate the enemy.

Another way to increase the constant pressure felt by the enemy is to take active measures to increase his levels of friction associated with the urban environment.⁴⁸ As

⁴⁸ Spiller presents the idea of turning friction into a weapon in his study, *Sharp Corners*, (2001, p. 107).

previously mentioned, friction affects both sides but to different degrees, depending on each side's ability to adjust to the enemy and environment. Mitigating the effects of friction has been the traditional technique used to increase unit performance. This technique is still valid, but also begs the question, "How much more effective could a unit be if it dropped its own levels of friction while raising those of its opponent?" Disruption of enemy communication capabilities, supply methods, disguising friendly strengths and weaknesses, psychological operations, deception, and continuous pressure are ways to possibly use the negative effects of friction against the enemy, instead of simply relying on the traditional passive measures taken to mitigate the enemy's effects on friendly elements.

Tipping urban friction in favor of friendly forces while applying constant pressure can only happen if units cease fighting urban operations in traditional linear-modes. The Germans and Israelis were stymied using these methods. The Marines were set back initially, but eventually adapted their tactics just enough to beat the NVA. Perhaps a better way to go about achieving the same results would be for a partial abandonment of linear (terrain oriented) tactics. A combination of internal and external pressures, formed by a conventional hammer and unconventional or SOF swarming operations, could take advantage of the benefits of shock, speed, and simultaneity.

Also, isolation needs to be recognized as powerful force, and should be achieved whenever possible in the urban setting. True physical isolation is very costly in terms of manpower, and can take time to achieve. Isolation is an effect that can also be applied to a variety of targets of organizational and moral worth with equal or greater effects and less cost. Isolating the enemy from the population and using diplomacy or the media, to isolate the enemy from other sources of support have a role to play in lowering the costs of urban warfare.

B. CONCLUSION

By examining three different militaries and qualitatively comparing their performance in urban and non-urban environments, we were able to identify differences in performance in 4 of the 5 factors we identified as most likely to be changed by the urban environment. While we could not prove conclusively the effects that the urban environment had on human factors, participants in the battles we studied did note the

importance for keeping units together under the strain of urban combat. Finally, clear commonalities in how militaries approached time, used their technology, and made decisions during urban operations offer lessons for future consideration. Our factor of information is a popular topic in urban operations literature, and results of our study reinforce the difficulty that can be expected in sensing, processing, and communicating various forms of information in the urban environment.

After comparing performances in urban and non-urban environments, we cannot say the urban environment is more difficult than a non-urban environment. Every environment presents challenges, and mitigating these challenges relative to an enemy's ability to do the same is the key for improving the probability of success. Future urban opponents are likely to hold several environmental advantages over our forces, given their expeditionary nature and their initial unfamiliarity when deployed to a new setting. Consequently, we need to train, educate, and tailor our forces to look forward and not dread fighting in cities.

Because urban fighting is about more than sound doctrine, room-clearing techniques, or technological quick fixes, more attention needs to be paid to the factors we have defined and examined. Understanding these will help military leaders with the ability to reduce the friction these factors invariably give rise to.

We hope this study has generated thought about urban operations beyond what is published and accepted in our doctrine. Where we might have once thought urban combat is a tougher type of combat, we now realized it is just different. Differences in warfare, call for innovation. More importantly, attention paid to them now will enable us to adjust to meet the threat before the fight begins rather than have to where the cost will be in treasure, blood, and more.

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